

ALASKA  
Department of  
Environmental  
Conservation

## ADDITIONAL SITE CHARACTERIZATION 4<sup>TH</sup> AND GAMBELL SITE

FINAL  
August 2010



Prepared by:

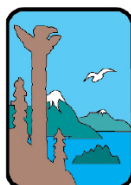


825 W. 8th Ave.  
Anchorage, AK 99501

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## ACRONYMS AND ABBREVIATIONS

ADEC .....	Alaska Department of Environmental Conservation
bgs .....	Below ground surface
DCE .....	Dichloroethene
DO .....	Dissolved oxygen
DRO .....	Diesel range organics
EPA .....	United States Environmental Protection Agency
ESA .....	Environmental site assessment
°F .....	Degrees Fahrenheit
GCL .....	Groundwater cleanup level
IDW .....	Investigation-derived waste
inHg .....	Inches of mercury
µg/kg .....	Micrograms per kilogram
mg/L .....	Milligrams per liter
NC .....	Northern Commercial
NTP .....	Notice to Proceed
OASIS .....	OASIS Environmental, Inc.
PCE .....	Tetrachloroethene
ppm .....	Parts per million
RPD .....	Relative percent difference
SCL .....	Soil cleanup level
TCE .....	Trichloroethene
UST .....	Underground storage tank
VOC .....	Volatile organic compound

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## EXECUTIVE SUMMARY

OASIS Environmental, Inc. (OASIS) conducted additional site characterization activities involving the vapor intrusion pathway for the 4<sup>th</sup> and Gambell site located in downtown Anchorage, Alaska. OASIS collected air samples at four residences north of the site in February and May 2010. During each event, soil gas samples were collected adjacent to each residence from permanent soil gas monitoring points. Indoor air samples were collected at the two western residences, while crawl space air samples were collected at the two eastern residences. Outdoor air samples also were collected. A passive soil gas survey of a four-block area also was performed to understand the distribution of contamination.

Analytical results from the two assessments indicate that tetrachloroethene (PCE), the primary contaminant of concern at the site, was present in soil gas at concentrations exceeding Alaska Department of Environmental Conservation (ADEC) target soil gas levels at all four residences for both sampling events. In addition, indoor air or crawl space air analytical results show that PCE also was present above ADEC indoor air target levels at all four residences for both sampling events. These findings indicate that PCE is present in the residences above risk-based target levels likely as a result of vapor intrusion.

These results were consistent with similar winter and spring assessments in 2009. The cumulative data from the four rounds of air sampling suggest that indoor air concentrations peak in the winter as compared to the spring sampling results, but the opposite holds for soil gas as the greater concentrations have been observed in spring. The crawl space analytical results have not been consistent.

Passive soil gas sampling showed that elevated PCE concentrations occur around the former C&K Cleaners and extend to the four residences where vapor intrusion assessments have occurred. These elevated PCE concentrations are assumed to represent vadose-zone contamination. The passive soil gas data also appear to map a groundwater plume moving northeast from the source area and a path of increased PCE concentrations that occur along the utility corridor in the alley.

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## 1. INTRODUCTION

Under Notice-to-Proceed (NTP) 18-4002-11-007, the Alaska Department of Environmental Conservation (ADEC) tasked OASIS Environmental, Inc. (OASIS) with conducting additional site characterization activities involving the vapor intrusion pathway at the 4th and Gambell site (hereafter, “the site”) in Anchorage, Alaska. The site is located on the northeast corner of the 4th Avenue and Gambell Street intersection (Figure 1). This report summarizes the results of sampling efforts in February and May 2010.

### 1.1. Objective

The objective for this project, based on the project plan outlined in *Additional Site Characterization Work Plan, 4th and Gambell* (OASIS 2009a), is to determine the potential for vapor intrusion at four buildings located north of the site and to delineate the source area of vadose-zone and groundwater contamination.

### 1.2. Project Organization

ADEC contracted OASIS to manage and execute this project under NTP 18-9028-13-52. OASIS subcontracted with Air Toxics Ltd, of Folsom, California, to perform analysis of air and soil gas samples. GORE and Associates were subcontracted to analyze passive soil gas samples.

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## 2. BACKGROUND

This section summarizes the environmental setting and previous investigations at the 4th and Gambell site. The environmental setting is based on information from existing investigation reports. Section 8 lists all referenced materials.

### 2.1. Environmental Setting

The following paragraph on the environmental setting at the site is taken from *Environmental Assessment* (EnviroAmerica 1993):

Local site conditions may consist of alluvium in abandoned stream channels and in terraces along modern streams. Gravel and sand appears to be generally well bedded and well sorted. Deposits in large channels and in other broad areas are chiefly gravel and thicker than deposits in small narrow channels and terraces, which contain chiefly sand and gravel; some channels and broad areas may contain significant amounts of peat, silt or clay.

Drilling logs from soil borings installed at the site indicate that vadose-zone soils are fine- to coarse-grained sands and gravel. The water table is located approximately 40 feet below ground surface (bgs), although the saturated zone appears to vary by as much as 5 feet. The groundwater flow direction has been mapped to the northeast. A layer of clay exists around 45 feet bgs and may serve as a confining layer for migration of contaminants (BGES 2005).

### 2.2. Previous Investigations

A Phase I environmental site assessment (ESA) was performed for the site in 1993. The Phase I ESA identified the operation of a C&K Cleaners from 1968 to 1970 and a Northern Commercial (NC) Tire Center from 1976 to 1978. C&K Cleaners appears to have been located on the western side of the property, and NC Tire Center appears to have been located on the eastern side of the property. The Phase I site reconnaissance indicated that an underground storage tank (UST) vent pipe was visible on the property. All buildings were removed from the site in 1978. The site has since served as a parking lot (EnviroAmerica 1993).

A Phase II ESA was performed in 1997. Trenches dug near the former C&K Cleaners unearthed a log crib with four empty drums marked for use in dry cleaning. A soil sample collected near the drums had a concentration of tetrachloroethene (PCE) of 3.2 parts per million (ppm). Seven hydraulic lifts, associated piping, sumps, an UST, and a log crib also were identified near the former NC Tire Center. Soil samples collected near the log crib had concentrations of PCE, ethylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, arsenic, barium, cadmium, and chromium above ADEC soil cleanup levels (SCLs). Three monitoring wells (MW-1, EPM-2, and EPM-3) also were installed. No volatile organic compounds (VOCs) were detected in MW-2 and MW-3. The concentration of PCE in MW-1 was 4.25 ppm (EPMI 1997).



Another Phase II ESA was performed in August 2004, which included excavation of six test pits, removal of five hydraulic lifts, removal of four USTs, removal of soil contaminated with diesel range organics (DRO) above the SCL, and identification of monitoring well MW-1. The hydraulic lifts and USTs were associated with the former NC Tire Center operation. The contaminated soil came from underneath the hydraulic lifts and USTs. Concentrations of PCE above the SCL were detected in three of the test pits. These three test pits were located on the western side of the property near the location of the former cleaners (BGES 2004b).

Monitoring well MW-1 was sampled in October 2004. The sample was analyzed for VOCs by United States Environmental Protection Agency (EPA) method 8260. The concentration of PCE was 2.28 milligrams per liter (mg/L), which exceeds the ADEC groundwater cleanup level (GCL) of 0.005 mg/L. All other compounds were less than laboratory reporting limits (BGES 2004a).

Three additional monitoring wells (MW-2, MW-3, and MW-4) were installed in March 2005. Soil samples were collected during drilling from various intervals and analyzed for VOCs. Concentrations of PCE ranged from 2,130 micrograms per kilogram ( $\mu\text{g/kg}$ ) in the interval from 36 to 38 feet bgs in MW-4 to 79,500  $\mu\text{g/kg}$  in the interval from 28 to 30 feet bgs in MW-2. All other compounds were less than laboratory reporting limits. PCE results for groundwater were 1.49 mg/L in MW-1, 0.0707 mg/L in MW-2, 1.79 mg/L in MW-3, and 0.372 mg/L in MW-4. All other compounds in groundwater were less than laboratory reporting limits. The conclusion was made that biodegradation of PCE was not occurring at a significant rate because of a lack of PCE daughter compounds and the oxygenated state of the aquifer (BGES 2005). However, it should be pointed out that dissolved oxygen (DO) was measured at ground surface in purge water obtained by the use of a bailer, which generally does not provide a representative measurement for DO.

Five soil borings (A, C, D, E, and F) were drilled and three monitoring wells (MW-5, MW-6, and MW-7) were installed in an assessment performed in 2007. Soil samples were collected from two or three intervals in all eight borings. Concentrations of PCE exceeded the SCL in all samples. Concentrations of PCE in groundwater exceeded the GCL of 0.005 mg/L in all three wells: 0.523 mg/L in MW-5, 0.822 mg/L in MW-6, and 0.0051 mg/L in MW-7 (BGES 2007).

A site characterization was performed in July 2008. The site characterization included drilling and sampling six soil borings (SB-1, SB-2, SB-3, SB-4, SB-5, and SB-6), sampling monitoring wells MW-5 and MW-6, and sampling two temporary wells (SB-1 and SB-2). Analytical results for soil borings SB-2, SB-3, SB-4, and SB-5 indicate an area of PCE-impacted soil that is located north and northeast of the former C&K Cleaners. Contamination is present at ground surface in the areas of SB-2, SB-3, and SB-4, but the significant mass of contamination occurs in a gravelly sand profile that begins around 15 feet bgs and extends to approximately 35 feet bgs. Analytical results from groundwater samples collected at the monitoring and temporary wells during this site characterization demonstrate that PCE exceeds the GCL underneath the entire area of the former C&K Cleaners. The plume appears to extend northeastward, which is the

reported direction of local groundwater flow. Based on the elevated PCE concentration in MW-2 and MW-6, the plume likely extends west of Gambell Street and north of 3<sup>rd</sup> Avenue, respectively. The absence of PCE or other significant concentrations of VOCs in temporary well SB-1 indicates that no upgradient source is contributing to contamination at the 4<sup>th</sup> and Gambell site (OASIS 2008).

Additional site characterization was performed in March 2009 and May 2009 with the inclusion of vapor intrusion assessments at four residential buildings located north of the 4<sup>th</sup> and Gambell site. The assessments included the collection of soil gas samples and outdoor air samples outside each building and the collection of either indoor air or crawl space air samples. Analytical results from the two assessments indicated that PCE was present in soil gas at concentrations exceeding ADEC target soil gas levels at all four residences for both sampling events. In addition, indoor air or crawl space air analytical results showed that PCE also was present above ADEC indoor air target levels at all four residences for both sampling events, except for the south duplex in June 2009. These findings indicated that PCE was present in the residences above risk-based screening levels, likely as a result of vapor intrusion (OASIS 2009b).

Figure 2 shows the locations of soil borings and monitoring wells discussed in this section.

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### 3. REGULATORY FRAMEWORK

A regulatory framework for this project has been developed using the following regulations and guidance documents:

- EPA, *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, November 2002
- Interstate Technology Regulatory Council, *Vapor Intrusion Pathway: A Practical Guideline*, January 2007
- California Environmental Protection Agency, *Advisory–Active Soil Gas Investigations*, January 28, 2003

#### 3.1. Contaminants of Concern

The contaminants of concern originally identified for the initial ADEC characterization effort in July 2008 included the following contaminants:

- PCE and its daughter compounds trichloroethene (TCE), cis-1,2-dichloroethene (DCE), trans-1,2-DCE, and vinyl chloride
- Petroleum hydrocarbons–benzene, toluene, ethylbenzene, xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, gasoline range organics, and DRO
- Heavy metals–arsenic, barium, cadmium, and chromium

However, the site characterization and subsequent vapor intrusion assessments demonstrated that PCE was the main release compound and the main contaminant affecting risk for the vapor intrusion pathway. Therefore, only risk-based screening levels for PCE and its degradation compounds will be used to evaluate air samples.

#### 3.2. Target Levels

A multiple-lines-of-evidence approach involving analytical data from outdoor air samples, indoor air samples, soil gas samples, weather conditions, and results of building surveys is used to evaluate the vapor intrusion pathway. If analysis of the lines of evidence indicates that indoor air concentrations appear to be the result of vapor intrusion, then indoor air analytical results are compared to ADEC indoor air target levels as presented in *Draft Vapor Intrusion Guidance at Contaminated Sites, July 2009*, to evaluate risk from vapor intrusion. The indoor air target levels represent an incremental cancer risk of 1 in 100,000 from chronic exposure to carcinogenic contaminants in indoor air or a hazard quotient of 1.0 for non-carcinogenic contaminants. Table 1 summarizes the ADEC screening levels for contaminants of concern as well as screening levels for soil gas concentrations.

**TABLE 1. TARGET LEVELS FOR CONTAMINANTS OF CONCERN,  
4<sup>TH</sup> AND GAMBELL, ANCHORAGE, ALASKA**

Compound	ADEC Residential Soil Gas Target Levels ( $\mu\text{g}/\text{m}^3$ )	ADEC Residential Indoor Air Target Levels ( $\mu\text{g}/\text{m}^3$ )
PCE	41	4.1
TCE	2.2	0.22
cis-1,2-DCE	370	37
trans-1,2-DCE	630	63
Vinyl chloride	8.1	0.81

Note:  $\mu\text{g}/\text{m}^3$  = Micrograms per cubic meter

## 4. FIELD ACTIVITIES

This section presents a summary of field activities associated with vapor intrusion assessments performed at four residential buildings in February and May 2010 and a passive soil gas survey conducted in April and May 2010. Vapor intrusion assessments were performed at the following four buildings:

- Single family residence located at 710 3<sup>rd</sup> Avenue
- Single family residence located at 720 3<sup>rd</sup> Avenue
- North duplex located at 736 3<sup>rd</sup> Avenue
- South duplex located at 736 3<sup>rd</sup> Avenue

This section is divided into subsections that address sampling activities by sample type. Appendix A contains a copy of field notes. Appendix B presents photographs of field activities.

### 4.1. Air Sampling

OASIS field personnel conducted two sampling events: February 2010 and May 2010. The following subsections detail the procedures for air sampling. Table 2 presents a summary of sample information. Figure 3 shows the sample locations for outdoor, indoor, crawl space, and soil gas air samples. Figure 4 presents the locations where passive soil gas modules were deployed.

#### 4.1.1. Outdoor, Indoor, and Crawl Space Air Samples

Outdoor, indoor, and crawl space air samples were collected in 6-liter, 100%-certified summa canisters with 24-hour flow controllers. The canisters for the indoor and outdoor air samples were elevated between 3 and 5 feet above the ground to capture the breathing zone for a seated individual. The canisters for the crawl space air samples were placed on the ground surface in the crawl space.

OASIS field personnel measured the initial vacuums in the canisters prior to sample collection to ensure adequate beginning vacuum. OASIS field personnel also measured the final vacuums in the canisters after 24 hours of sample collection.

#### 4.1.2. Soil Gas Samples

The process for sampling the soil gas monitoring points began with a leak check of the monitoring point and sample manifold. The leak check was comprised of two parts: a manifold check and a soil gas monitoring point check. The following procedure was used for conducting the manifold leak check:

- Measured the initial vacuum in the summa canister.
- Connected the entire sample train. This entailed attaching a piece of Teflon sample tubing to the sub-slab monitoring point and the other end to the monitoring point valve on the inside of the leak detection hood. Another piece of Teflon sample tubing was then connected to the monitoring point valve on the

outside of the leak detection hood and the other end to the manifold. Then, the helium supply was connected to the leak detection hood; the pump was connected to the pump valve on the manifold; and the rotameter was connected to the other side of the pump. Lastly, a 30-minute flow controller and 1-liter summa canister were connected to each other, and the other end of the flow controller was connected to the sample valve on the manifold. Figure 5 shows a schematic of the leak detection system.

- Closed the monitoring point valve on the leak detection hood and opened the sample and pump valves. Ran the sample pump so that a vacuum was pulled on the manifold.
- Closed the pump valve and turned off the pump. Verified that the manifold maintained a constant vacuum.

At this point, the leak check for the soil gas monitoring point was performed. The following process was used for the soil gas monitoring point leak check:

- Opened the monitoring point and pump valves and turned on the sample pump. Verified that the flow rate was 200 milliliters per minute using the rotameter.
- Allowed helium to flood the leak detection hood for approximately one minute. Measured the helium concentration in the leak detection hood by sampling the exhaust port on the leak detection hood.
- Purged 2 liters of soil gas (ten minutes of purging). During purging, connected a tedlar bag to the exhaust line of the rotameter to collect a sample of the purge air. At the completion of the purge, analyzed the helium concentration of the air in the tedlar bag using a helium detector. A reading of less than 10% of the helium concentration measured in the leak detection hood was considered a successful leak check.
- Measured oxygen, carbon dioxide, and volatile compound readings from the tedlar bag using a multi-gas meter.

At this point, the soil gas sample was collected. The following process occurred:

- Closed the pump valve on the manifold, turned off the pump, and verified that the sample valve was open on the manifold.
- Opened the valve on the summa canister and allowed the canister to fill for 30 minutes.
- Closed the valve on the summa canister at the end of 30 minutes, disconnected the flow controller from the summa canister, and measured the final vacuum in the canister.

#### **4.1.3. Passive Soil Gas Sampling**

OASIS conducted passive soil gas sampling to delineate the extent of the PCE-impacted soil in the vadose zone. OASIS deployed GORESorber® modules along a grid as depicted in Figure 4, except where property access prevented the installation of a

module. The grid began at the northeast corner of the intersection of 4<sup>th</sup> Avenue and Gambell Street and proceeded at 50-foot spacing to the east and north.

The modules were deployed at a depth of 3 feet bgs. The process involved using a rotary hammer drill to bore a 1-inch boring to a depth of 3 feet. The modules were inserted into the boring using a stainless steel insertion rod. Each module had string attached to it that extended to the ground surface where the string was tied to a cork for capping the boring. The modules were left in place to absorb contaminant vapors for two weeks, at which time they were retrieved and shipped to GORE for analysis of chlorinated solvents by gas chromatograph/mass spectrometry. A total of 176 modules, which includes 16 duplicate samples, were installed. Four probes were not recovered.

## 4.2. Work Plan Deviations

OASIS prepared *Additional Site Characterization Work Plan, 4th and Gambell* (OASIS 2009a), which outlined the strategy and methodology for the evaluation of the vapor intrusion pathway. The fieldwork was executed as per the plan except for the following deviation:

- A vapor intrusion assessment was to be performed at the residence located at 744 E 3<sup>rd</sup> Avenue. However, OASIS was not able to contact the tenants of the residence despite repeated attempts. OASIS tried to contact the tenants by going through the property owner, but the property owner had no contact information for the tenants.
- Four proposed passive soil gas sample locations were not sampled because of restricted access. These locations were K-3, J-5, J-6, and J-7.

## 4.3. Investigation-Derived Waste

Field activities for the vapor intrusion assessments generated minimal investigation-derived waste (IDW). Solid IDW included used personal protective equipment and sampling equipment, such as Teflon tubing and tedlar bags. These items were disposed of at the Anchorage landfill as hazardous using OASIS' conditionally exempt small quantity generator status. No aqueous IDW was generated.



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## 5. RESULTS

This section discusses field observations and analytical results of the vapor intrusion assessments. It is divided into subsections based on the type of sampling. Results are discussed by sampling event and building. Appendix C contains a copy of the laboratory analytical reports.

### 5.1. Air Sampling

This subsection presents analytical results for the vapor intrusion assessments at the four buildings.

#### 5.1.1. February 2010

Air samples were collected from February 25 to 26, 2010. The barometric pressure consistently increased during the sampling event. The readings began at 29.34 inches of mercury (inHg) and ended at 29.80 inHg, which also corresponded to the minimum and maximum pressure readings (see Figure 6). Temperatures ranged from 18 degrees Fahrenheit (°F) to 30°F.

##### 5.1.1.1. 710 3<sup>rd</sup> Avenue

Table 3 presents analytical results for air samples collected in February 2010 at 710 3<sup>rd</sup> Avenue. Figure 7 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-1, the indoor air sample, and the outdoor air sample. The soil gas concentration exceeded the ADEC soil gas target level, and the indoor air concentration exceeded the indoor air target level.

Given that PCE was detected in both the soil gas and indoor air samples, the evidence suggests that PCE is present in the residence at least partially because of vapor intrusion, and the compound possibly exceeds the indoor air target level because of vapor intrusion. The potential for some background source of PCE in the residence remains a possibility without sub-slab analytical data. The outdoor PCE concentration was negligible relative to the soil gas and indoor air concentrations.

##### 5.1.1.2. 720 3<sup>rd</sup> Avenue

Table 4 presents analytical results for air samples collected in February 2010 at 720 3<sup>rd</sup> Avenue. Figure 7 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-2, the indoor air sample, and the outdoor air sample. The soil gas concentration of PCE exceeded the ADEC soil gas target level by two orders of magnitude. The indoor air concentration of PCE exceeded the ADEC indoor air target level by one order of magnitude.

Given that PCE was detected in both the soil gas and indoor air samples at concentrations exceeding target levels, the evidence suggests that PCE is present in the residence at least partially because of vapor intrusion, and the compound possibly exceeds the indoor air target level because of vapor intrusion. The potential for some

background source of PCE in the residence remains a possibility without sub-slab analytical data. The outdoor PCE concentration was negligible relative to the soil gas and indoor air concentrations.

#### **5.1.1.3. North Duplex**

Table 5 presents analytical results for air samples collected in February 2010 from the north duplex located at 736 3<sup>rd</sup> Avenue. Figure 7 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-3 but at a concentration less than the ADEC soil gas target level. PCE and vinyl chloride were detected in the crawl space air sample from the duplex. The concentration of PCE exceeded the indoor air target level by an order of magnitude, but the vinyl chloride concentration was on order of magnitude less than the indoor air target level.

PCE was detected in both the soil gas and crawl space air samples, but the crawl space concentration was significantly greater than the soil gas sample. This could be because there is a background source of PCE in the crawl space, or it could be a result of natural variation that occurs when sampling near-slab soil gas. The data is too inconclusive at this point to effectively evaluate the vapor intrusion pathway. The outdoor PCE concentration was negligible relative to the soil gas and indoor air concentrations.

#### **5.1.1.4. South Duplex**

Table 6 presents analytical results for air samples collected in February 2010 from the south duplex located at 736 3<sup>rd</sup> Avenue. Figure 7 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-4 at a concentration approximately six times the soil gas target level. PCE also was detected in the crawl space air sample from the duplex, and the concentration exceeded the indoor air target level. PCE was detected in the outdoor air sample at a concentration that likely has minimal contribution to the measured crawl space air concentration for PCE.

Given that PCE was detected in both the soil gas and crawl space air samples at concentrations exceeding target levels, the evidence suggests that PCE is present in the crawl space at least partially because of vapor intrusion, and the compound possibly exceeds the indoor air target level because of vapor intrusion. There remains a potential for some background source of PCE in the crawl space or residence.

#### **5.1.2. May 2010**

Samples were collected on May 13 and 14, 2010. The barometric pressure increased during the first five hours of sample collection, followed by a downward trend during the remaining 19 hours of sample collection. The readings began at 29.95 inHg and ended at 29.75 inHg. The minimum pressure was 29.75 inHg, and the maximum was 29.98 inHg (see Figure 8). Temperatures ranged from 41°F to 53°F.

#### **5.1.2.1. 710 3<sup>rd</sup> Avenue**

Table 7 presents analytical results for air samples collected in May 2010 at 710 3<sup>rd</sup> Avenue. Figure 9 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-1, the indoor air sample, and the outdoor air sample. The soil gas concentration exceeded the ADEC soil gas target level, and the indoor air concentration exceeded the indoor air target level.

Given that PCE was detected in both the soil gas and indoor air samples, the evidence suggests that PCE is present in the residence at least partially because of vapor intrusion. The potential for some background source of PCE in the residence remains a possibility without sub-slab analytical data. The outdoor PCE concentration was negligible relative to the soil gas and indoor air concentrations.

#### **5.1.2.2. 720 3<sup>rd</sup> Avenue**

Table 8 presents analytical results for air samples collected in May 2010 at 720 3<sup>rd</sup> Avenue. Figure 9 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-2, the indoor air sample, and the outdoor air sample. The soil gas concentration was more than two orders of magnitude greater than the ADEC soil gas target level, and the indoor air concentration exceeded the indoor air target level.

Given that PCE was detected in both the soil gas and indoor air samples at concentrations exceeding target levels, the evidence suggests that PCE is present in the residence at least partially because of vapor intrusion, and the compound possibly exceeds the indoor air target level because of vapor intrusion. The potential for some background source of the PCE in the residence remains a possibility without sub-slab analytical data. The outdoor PCE concentration was negligible relative to the soil gas and indoor air concentrations.

#### **5.1.2.3. North Duplex**

Table 9 presents analytical results for air samples collected in May 2010 from the north duplex located at 736 3<sup>rd</sup> Avenue. Figure 9 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-3, the crawl space sample, and the outdoor air sample. Both the soil gas concentration and crawl space concentration exceeded the respective target levels by more than one order of magnitude.

Given that PCE was detected in both the soil gas and crawl space air samples at concentrations exceeding target levels, the evidence suggests that PCE is present in the crawl space at least partially because of vapor intrusion, and the compound possibly exceeds the indoor air target level because of vapor intrusion. The potential for some background source of PCE in the crawl space or residence remains a possibility. The outdoor PCE concentration was negligible relative to the soil gas and indoor air concentrations.

#### **5.1.2.4. South Duplex**

Table 10 presents analytical results for air samples collected in May 2010 from the south duplex located at 736 3<sup>rd</sup> Avenue. Figure 9 displays a subset of analytical results.

PCE was detected in the soil gas sample from SG-4 at a concentration more than one order of magnitude above the soil gas target level. PCE also was detected in the crawl space air sample from the duplex, and the concentration exceeded the indoor air target level. PCE was detected in the outdoor air sample at a concentration that likely has minimal contribution to the measured crawl space air concentration for PCE.

Given that PCE was detected in both the soil gas and crawl space air samples at concentrations exceeding screening levels, the evidence suggests that PCE is present in the crawl space at least partially because of vapor intrusion, and the compound possibly exceeds the indoor air target level because of vapor intrusion. The potential for some background source of PCE in the crawl space or residence remains a possibility. The outdoor PCE concentration was negligible relative to the soil gas and indoor air concentrations.

#### **5.1.3. Cumulative Air Results**

Table 11 presents cumulative analytical results from the four rounds of air sampling at the four buildings. The data appear to be showing seasonal trends. For instance, indoor air results in the two residences have been greater in the winter than in the spring, and soil gas results at the two residences and two duplexes have been greater in the spring than in the winter. The greater indoor air concentrations in winter may be a result of structures being more closed and increased heating demand. The greater soil gas concentrations in the spring likely are the result of a warmer source that increases vapor partitioning.

The crawl space results, however, have no apparent trend as the greater concentration has varied between seasons. A possibility for this lack of trend may be the minimal circulation that occurs in these spaces; therefore, dilution is based on random events and not seasonal patterns.

### **5.2. Passive Soil Gas Sampling**

Passive soil gas sample modules were deployed on April 27 – 29, 2010, and recovered on May 12, 2010. Appendix D contains the analytical data as reported in mass (micrograms) and estimated concentrations using sampling durations. Appendix D also contains a color contour map of estimated soil gas concentrations. Based on this figure, the results indicate an area of elevated PCE concentrations (i.e., purple shading) around the former C&K Cleaners. The contamination appears to extend to the locations of the soil gas monitoring points and therefore provides explanation for the elevated PCE concentrations measured in the soil gas monitoring points. These results are assumed to represent contamination present in the vadose zone.

Additional coloration (i.e., yellow) occurs in a northeast direction from the source area near sample locations E-7, G-8, J-11, and K-12. Groundwater is documented as flowing

in a northeasterly direction; therefore, this color pattern likely represents a groundwater plume moving away from the source area.

More coloration (i.e., yellow) also is present along the eastern side of the fourth row of modules. At this time, there is no known reason to suspect a source in this area, although no Phase I assessment has been done as part of this investigation. It should be noted that the fourth row was installed along the north side of the alley. The alley has buried water, gas, and cable utilities. Therefore, it is possible that these utilities are providing a preferential pathway for the migration of contaminant vapors.

Finally, low-level detection of PCE occurred nearly throughout the investigation area as indicated by the blue shading on the figure in the appendix. It is assumed that this is a result of migrating soil vapors and groundwater contamination from the source area at the former C&K Cleaners.

TCE concentrations in the passive soil gas survey are limited to the main source area near the former C&K Cleaners. This result supports previous conclusions that PCE is the main release compound, and minimal biodegradation appears to be occurring.

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## 6. QUALITY ASSURANCE REVIEW

This section summarizes the results of a data review to determine data quality and to evaluate potential impact on the usability of the data. The review was performed using EPA Level II laboratory data reports that were provided by Air Toxics Ltd. Laboratory analytical reports are provided in Appendix C. ADEC data review checklists for air analysis are included in Appendix E.

### 6.1. February 2010

The following list provides a brief review of how data compared to data quality indicators:

- All work was performed by OASIS personnel who are qualified individuals as per 18 AAC 75.990(100).
- Completeness—100% of samples submitted were analyzed, thereby meeting the data quality objective of 95%.
- Accuracy—All percent recoveries for surrogates and laboratory control samples met control limits.
- Precision—A field duplicate sample was collected for both TO-15 and TO-15 SIM analysis. The laboratory also ran a laboratory duplicate for TO-15 and TO-15 SIM. Relative percent differences (RPDs) for the laboratory and field duplicates were all less than 25%.
- Comparability—Samples were analyzed by the same analytical methods. Laboratory reporting limits were less than ADEC indoor air target levels for contaminants of concern except where elevated concentrations of non-target analytes caused increased reporting limits for contaminants of concern, such as TCE. However, in these cases, such as for the crawl space sample at the south duplex, the PCE concentration, the primary contaminant, was sufficiently high to still be detected and determine exposure levels; therefore, the potential omission of TCE near the indoor air target level is minimized. The same field personnel performed all sampling and previous sampling events.
- Representativeness—Air sample collection rates were based on possible exposure scenarios. Sub-slab samples had leak detection performed prior to sampling to ensure that ambient indoor air was not infiltrating the sample train. A trip blank was analyzed to assess potential cross-contamination at the site. No compounds were detected.

### 6.2. May 2010

The following list provides a brief review of how data compared to data quality indicators:

- All work was performed by OASIS personnel who are qualified individuals as per 18 AAC 75.990(100).
- Completeness—100% of samples submitted were analyzed, thereby meeting the data quality objective of 95%.



- Accuracy—All percent recoveries for surrogates and laboratory control samples met control limits.
- Precision—A field duplicate sample was collected for TO-15 SIM analysis. The laboratory also ran a laboratory duplicate for TO-15 SIM. RPDs for the laboratory and field duplicates were all less than 25%.
- Comparability—Samples were analyzed by the same analytical methods. Laboratory reporting limits were less than ADEC indoor air target levels for contaminants of concern, except for TCE in the crawl space samples from the duplexes. The reason is that elevated concentrations of non-target analytes caused increased reporting limits. However, PCE was still detected above target levels, thereby providing the primary risk factor and minimizing the omission of TCE data. The same field personnel performed all sampling and previous sampling events.
- Representativeness—Air sample collection rates were based on possible exposure scenarios. Sub-slab samples had leak detection performed prior to sampling to ensure that ambient indoor air was not infiltrating the sample train. All canisters were received at the laboratory with remaining vacuum except samples 115AA (AA-2) and 117IA (IA-1); however, analytical results for these samples were comparable with past results, and therefore no qualification was made. A trip blank was analyzed to assess potential cross-contamination at the site. No compounds were detected.

## 7. EVALUATION

OASIS collected air samples at four residences north of the 4<sup>th</sup> and Gambell site in February and May 2010. During each event, soil gas samples were collected adjacent to each residence from permanent soil gas monitoring points. Indoor air samples were collected at the two western residences, while crawl space air samples were collected at the two eastern residences. Outdoor air samples also were collected. Passive soil gas samples were collected over a two-week period from the end of April to early May. The following subsections provide a summary of findings and recommendations.

### 7.1. Findings

PCE was the only compound that regularly exceeded indoor air target levels and also was regularly detected in soil gas samples for the February and May sampling events. The following list shows by building when PCE exceeded indoor air target levels presumably as a result of vapor intrusion:

- 710 E 3rd Ave – March and June 2009, February and May 2010
- 720 E 3rd Ave – March and June 2009, February and May 2010
- 736 E 3rd Ave (North Duplex) – March and June 2009, February and May 2010
- 736 E 3rd Ave (South Duplex) – March 2009, February and May 2010

The findings are based on near-building soil gas data combined with indoor or crawl space air data. It should be noted that near-building soil gas data are not as convincing a line of evidence as sub-slab data, but this also only applies to 710 E 3<sup>rd</sup> Ave and 720 E 3<sup>rd</sup> Ave because the duplexes have crawl spaces.

The four rounds of sampling appear to indicate seasonal trends in PCE concentrations:

- The indoor air concentrations are less in the spring than in the winter. Closed structures and increased heating demand are potential explanations for the increased winter concentrations.
- The soil gas concentrations are greater in the spring than in the winter. Warmer soil temperatures likely are increasing vapor migration by yielding more volatilization and providing less resistance (i.e., no frozen soil to impede mobility).

Passive soil gas sampling showed that elevated PCE concentrations occur around the former C&K Cleaners. The extent of the contamination approximately follows the arc of soil gas monitoring points SG-1, SG-2, SG-3, and SG-4. The elevated PCE concentrations represent the vadose-zone contamination. The passive soil gas data also appear to map a groundwater plume moving northeast from the source area and an area of increased PCE concentrations along the utility corridor in the alley. TCE was identified only in a small area near the former C&K Cleaners, which provides further evidence that PCE is the primary contaminant and that biodegradation is minimal.

## 7.2. Recommendations

The following recommendations are provided to further investigate and understand the pathways of exposure and risk to receptors at the 4<sup>th</sup> and Gambell site. The recommendations serve as options for ADEC to consider in future project planning. ADEC is not obligated to enact or implement any or all of the recommendations.

- Inform the residents of the recent results and the comparability to past results.
- Consult with the property owners about possible mitigation options for reducing indoor air and crawl space concentrations of PCE.
- Consider performing vapor intrusion assessments in the summer and fall to augment the winter and spring data that have been collected to date.
- Inform First Native Baptist Church and PIP Printing that elevated soil gas concentrations of PCE were detected near their buildings. Perform a building survey to understand occupancy patterns and determine if there are regular occupants potentially at risk for exposure to PCE from vapor intrusion.
- Review past EPA investigation reports on the former native hospital property to determine the extent to which the apparent groundwater plume of PCE has been characterized. If necessary, proceed with additional characterization of groundwater to understand potential risk to downgradient receptors near Ship Creek.
- Evaluate the feasibility of potential remedial options for the former C&K Cleaners property to address the source of contamination.

## 8. REFERENCES

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- . 2005. *Fourth Avenue and Gambell Street, Anchorage, Alaska, Phase II Environmental Site Assessment*. May.
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- Environmental Project Management, Inc. (EPMI). 1997. *Initial Site Characterization and Subsurface Investigation Report, 4th and Gambell, Anchorage, Alaska*. December.
- OASIS Environmental, Inc. (OASIS). 2008. *Site Characterization Report, 4th and Gambell Site*. prepared for ADEC. September.
- . 2009a. *Additional Site Characterization, Work Plan, 4th and Gambell Site*. prepared for ADEC. December.
- . 2009b. *Vapor Intrusion Assessment, 4th and Gambell Site*. Prepared for ADEC. August.

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## TABLES

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**Table 2**  
**Air Sample Summary**  
**4th and Gambell Additional Site Characterization**

Sample Location	Building	Sample Number	Date	Sample Type	Duration	Description	Comments
AA-1	720 3rd Avenue	104AG114AA	5/13/2010	Outdoor Air	24-hour	Southeast side of residence	
		104AG101AA	2/25/2010				
IA-1	710 3rd Avenue	104AG117IA 104AG118IA	5/13/2010	Indoor Air	24-hour	Living room	104AG117IA was measured at ambient air pressure in the field. 104AG118IA is a duplicate
		104AG103IA 104AG104IA	2/25/2010				104AG104IA is a duplicate
SG-1	710 3rd Avenue	104AG121SG	5/13/2010	Soil Gas	30-minute	South side of building	
		104AG109SG 104AG110SG	2/25/2010				104AG110SG is a duplicate
IA-2	720 3rd Avenue	104AG116IA	5/13/2010	Indoor Air	24-hour	Living room	Received with significant vacuum remaining in the canister which resulted in elevated reporting limits
		104AG102IA	2/25/2010				
SG-2	720 3rd Avenue	104AG122SG	5/13/2010	Soil Gas	30-minute	South side of building	
		104AG108SG	2/25/2010				
AA-2	Duplexes	104AG115AA	5/13/2010	Outdoor Air	24-hour	Between duplexes	Measured at ambient air pressure in the field.
		104AG105AA	2/25/2010				
CS-1	North Duplex	104AG119CS	5/13/2010	Crawl Space Air	24-hour	Center of crawl space/basement	Diluted due to high concentrations of non-target species
		104AG106CS	2/25/2010				
SG-3	North Duplex	104AG123SG	5/13/2010	Soil Gas	30-minute	Southwest side of building	
		104AG111SG	2/25/2010				
CS-2	South Duplex	104AG120CS	5/13/2010	Crawl Space Air	24-hour	East side of crawl space	Diluted due to high concentrations of non-target species
		104AG107CS	2/25/2010				
SG-4	South Duplex	104AG124SG	5/13/2010	Soil Gas	30-minute	West side of building	
		104AG112SG	2/25/2010				



**Table 3**  
**Analytical Results**  
**710 E 3rd Avenue - February 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Indoor Air		Outdoor Air	Soil Gas	
			IA-1			SG-1	
			Primary	Duplicate	AA-1	Primary	Duplicate
Field Parameters							
Total Volatile Hydrocarbons	ppm	---	---	---	---	90	---
Oxygen	%	---	---	---	---	20.9	---
Carbon dioxide	%	---	---	---	---	0.2	---
Helium	%	---	---	---	---	0	---
Volatile Organic Compounds							
PCE	µg/m <sup>3</sup>	4.1	8.3	9.1	0.26	160	160

Notes: Bolded indoor air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

PCE = Tetrachloroethene

ppm = Parts per million

**Table 4**  
**Analytical Results**  
**720 E 3rd Avenue - February 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Indoor Air	Outdoor Air	Soil Gas
			IA-2	AA-1	SG-2
Field Parameters					
Total Volatile Hydrocarbons	ppm	---	---	---	85
Oxygen	%	---	---	---	20.4
Carbon dioxide	%	---	---	---	0.6
Helium	%	---	---	---	0
Volatile Organic Compounds					
PCE	µg/m <sup>3</sup>	4.1	51	0.26	6,800

Notes: Bolded indoor air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

PCE = Tetrachloroethene

ppm = Parts per million

**Table 5**  
**Analytical Results**  
**North Duplex - February 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Crawl Space	Outdoor Air	Soil Gas
			CS-1	AA-2	SG-3
Field Parameters					
Total Volatile Hydrocarbons	ppm	---	---	---	45
Oxygen	%	---	---	---	20.9
Carbon dioxide	%	---	---	---	0.4
Helium	%	---	---	---	0
Volatile Organic Compounds					
PCE	µg/m <sup>3</sup>	4.1	57	2.3	28
TCE	µg/m <sup>3</sup>	0.22	ND (0.16)	0.50	ND (8.1)
Vinyl chloride	µg/m <sup>3</sup>	0.81	0.055	ND (0.048)	ND (3.9)

Notes: Value in parentheses is laboratory reporting limit.

Bolded crawl space air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

ND = Not detected

PCE = Tetrachloroethene

ppm = Parts per million

TCE = Trichloroethene

**Table 6**  
**Analytical Results**  
**South Duplex - February 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Crawl Space	Outdoor Air	Soil Gas
			CS-2	AA-2	SG-4
Field Parameters					
Total Volatile Hydrocarbons	ppm	---	---	---	100
Oxygen	%	---	---	---	20.9
Carbon dioxide	%	---	---	---	0.8
Helium	%	---	---	---	0
Volatile Organic Compounds					
PCE	µg/m <sup>3</sup>	4.1	12	2.3	260
TCE	µg/m <sup>3</sup>	0.22	ND (0.83)	0.50	ND (6.6)

Notes: Value in parentheses is laboratory reporting limit.

Bolded crawl space air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

ND = Not detected

PCE = Tetrachloroethene

ppm = Parts per million

TCE = Trichloroethene

**Table 7**  
**Analytical Results**  
**710 E 3rd Avenue - May 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Indoor Air		Outdoor Air	Soil Gas
			IA-1		AA-1	SG-1
			Primary	Duplicate		
Field Parameters						
Total Volatile Hydrocarbons	ppm	---	---	---	---	110
Oxygen	%	---	---	---	---	20.9
Carbon dioxide	%	---	---	---	---	0.3
Helium	%	---	---	---	---	0
Volatile Organic Compounds						
PCE	µg/m <sup>3</sup>	4.1	6.6	7.2	0.3	260

Notes: Bolded indoor air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

PCE = Tetrachloroethene

ppm = Parts per million

**Table 8**  
**Analytical Results**  
**720 E 3rd Avenue - May 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Indoor Air	Outdoor Air	Soil Gas
			IA-2	AA-1	SG-2
Field Parameters					
Total Volatile Hydrocarbons	ppm	---	---	---	140
Oxygen	%	---	---	---	20.9
Carbon dioxide	%	---	---	---	0.6
Helium	%	---	---	---	0
Volatile Organic Compounds					
PCE	µg/m <sup>3</sup>	4.1	25	0.3	10,000

Notes: Bolded indoor air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

PCE = Tetrachloroethene

ppm = Parts per million

**Table 9**  
**Analytical Results**  
**North Duplex - May 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Crawl Space	Outdoor Air	Soil Gas
			CS-1	AA-2	SG-3
Field Parameters					
Total Volatile Hydrocarbons	ppm	---	---	---	110
Oxygen	%	---	---	---	20.9
Carbon dioxide	%	---	---	---	0.5
Helium	%	---	---	---	0
Volatile Organic Compounds					
PCE	µg/m <sup>3</sup>	4.1	110	0.37	230

Notes: Bolded crawl space air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

PCE = Tetrachloroethene

ppm = Parts per million

**Table 10**  
**Analytical Results**  
**South Duplex - May 2010**  
**4th and Gambell Additional Site Characterization**

Compound	Units	Indoor Target Level	Crawl Space	Outdoor Air	Soil Gas
			CS-2	AA-2	SG-4
Field Parameters					
Total Volatile Hydrocarbons	ppm	---	---	---	150
Oxygen	%	---	---	---	20.9
Carbon dioxide	%	---	---	---	0.7
Helium	%	---	---	---	0
Volatile Organic Compounds					
PCE	µg/m <sup>3</sup>	4.1	16	0.37	630

Notes: Value in parentheses is laboratory reporting limit.

Bolded crawl space air value exceeds ADEC indoor air target level.

Key:

% = Percent

ADEC = Alaska Department of Environmental Conservation

µg/m<sup>3</sup> = Micrograms per cubic meter

PCE = Tetrachloroethene

ppm = Parts per million



**Table 11**  
**Cumulative Air Sample Analytical Results**  
**4th and Gambell Additional Site Characterization**

Building	Compound	Sample Date	Heating System On	Temperature Range (°F)	Barometric Pressure	Sample Location			
						Indoor Air (µg/m <sup>3</sup> )	Crawl Space (µg/m <sup>3</sup> )	Outdoor Air (µg/m <sup>3</sup> )	Soil Gas (µg/m <sup>3</sup> )
710 E 3rd Ave	PCE	5/13/2010	Yes	22-34	Falling	<b>6.6</b>	NA	0.3	260
		2/25/2010	Yes	18 - 30	Rising	<b>8.3</b>	NA	0.26	160
		6/12/2009	No	49 - 61	Falling	2.3	NA	ND (4.5)	300
		3/2/2009	Yes	3 - 20	Rising	<b>8.0</b>	NA	ND (0.84)	45
720 E 3rd Ave	PCE	5/13/2010	Yes	22-34	Falling	<b>25</b>	NA	0.3	10,000
		2/25/2010	Yes	18 - 30	Rising	<b>51</b>	NA	0.26	6,800
		6/12/2009	No	49 - 61	Falling	<b>15</b>	NA	ND (4.5)	13,000
		3/3/2009	Yes	13 - 19	Rising	<b>58</b>	NA	ND (0.84)	2,100
North Duplex	PCE	5/13/2010	Yes	22-34	Falling	NS	<b>110</b>	0.37	230
		2/25/2010	Yes	18 - 30	Rising	NS	<b>57</b>	2.3	28
		6/12/2009	No	49 - 61	Falling	NS	<b>74</b>	ND (5.0)	86
		3/2/2009	Yes	3 - 20	Rising	NS	<b>170</b>	0.95	17
South Duplex	PCE	5/13/2010	Yes	22-34	Falling	NS	<b>16</b>	0.37	630
		2/25/2010	Yes	18 - 30	Rising	NS	<b>12</b>	2.3	260
		6/12/2009	No	49 - 61	Falling	NS	ND (1.1)	ND (5.0)	560
		3/2/2009	Yes	3 - 20	Rising	NS	<b>14</b>	0.95	89

Notes: Value in parentheses is laboratory reporting limit.

Bolded indoor air values exceed ADEC indoor air target level.

Key:

°F = Degrees Fahrenheit

µg/m<sup>3</sup> = Micrograms per cubic meter

NA = Not applicable

ND = Not detected

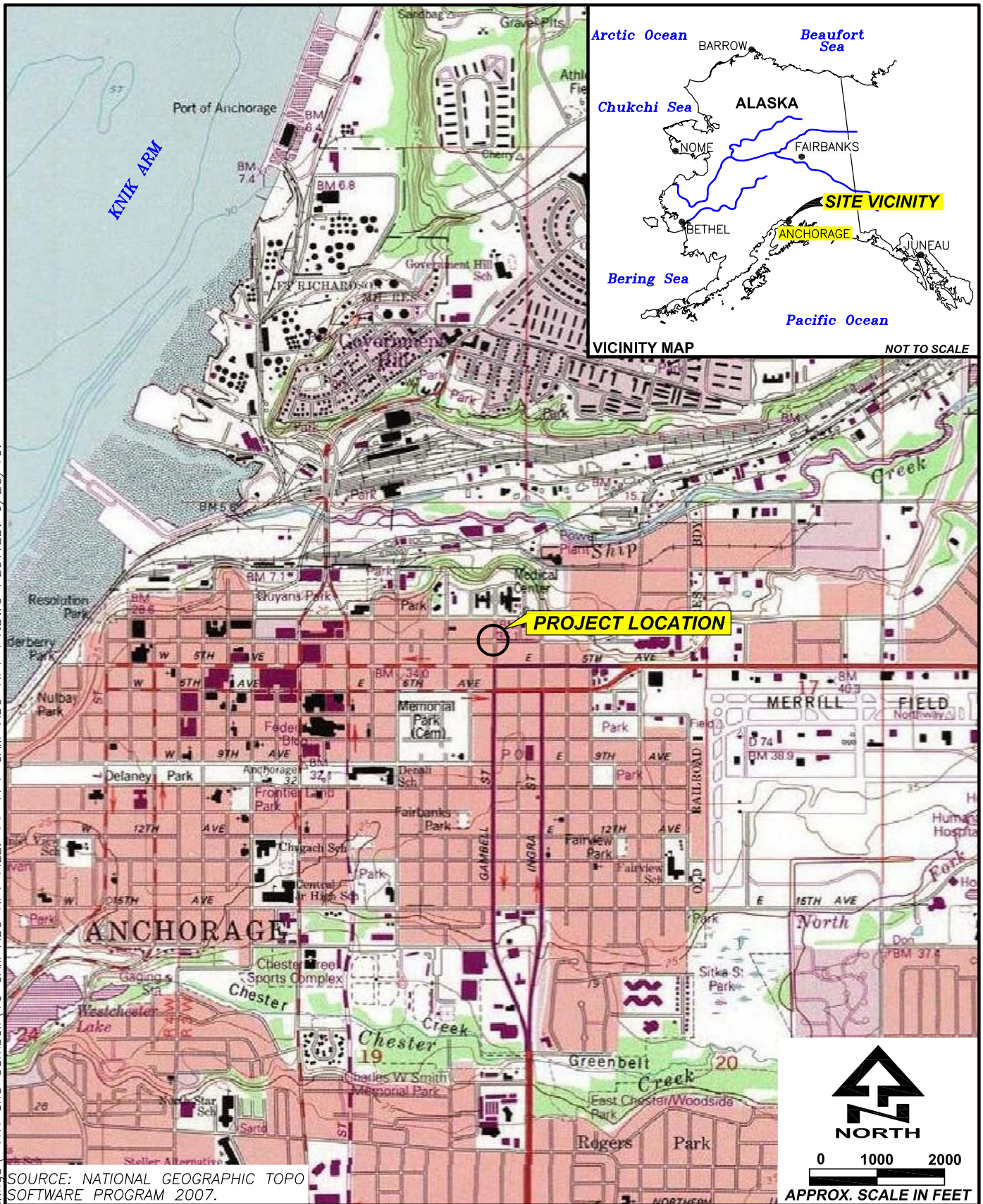
NS = Not sampled

PCE = Tetrachloroethene

## FIGURES

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PATH: V:\Project Drawings\ 4TH and Gambell\10 GAM ASC RPT FILE: 14-174-GAM-ASC-RPT-F1.DWG PLOTTED: 6/25/10.



SOURCE: NATIONAL GEOGRAPHIC TOPO  
SOFTWARE PROGRAM 2007.



DATE: JUNE 2010  
CHKD: B.J.M.  
DRAWN: C.E.H.  
PROJ. No.: 14-174  
825 W. 8th Ave., Anchorage,  
AK 99501, (907) 258-4880

## SITE LOCATION MAP

4TH AND GAMBELL  
ADDITIONAL SITE CHARACTERIZATION  
Anchorage, Alaska

FIGURE

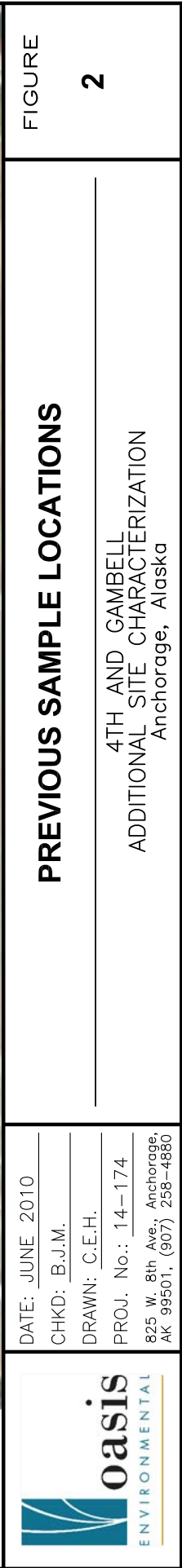
1



**EXPLANATION**

MW11 ● MONITORING WELL LOCATION  
 SB-1 ⊕ 2008 SOIL BORING LOCATION  
 A ⊗ 2007 SOIL BORING LOCATION

SOURCE: AERIAL PHOTO PROVIDED BY GOOGLE EARTH PRO. 2008.







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## AIR SAMPLE LOCATIONS

4TH AND GAMBELL  
 ADDITIONAL SITE CHARACTERIZATION  
 Anchorage, Alaska

FIGURE

3

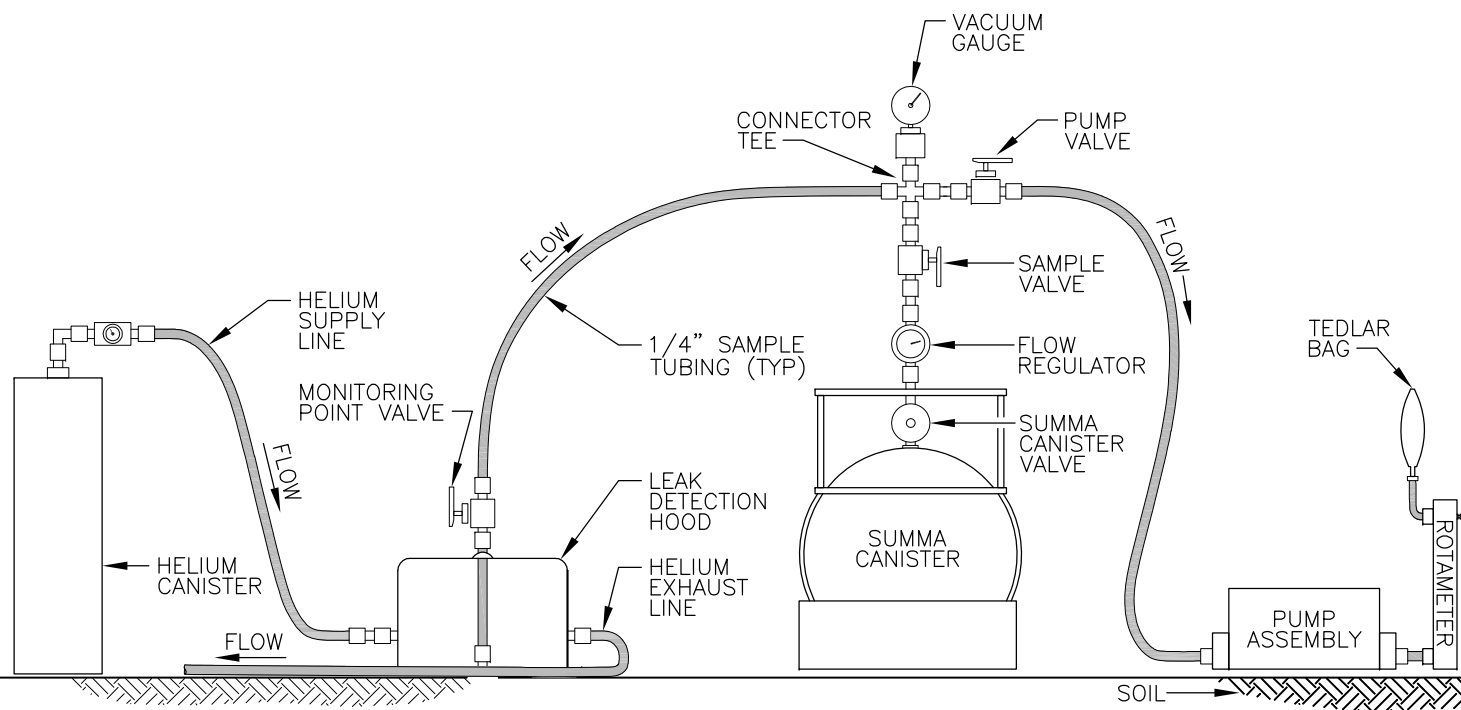


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FIGURE <b>4</b>	
<b>PASSIVE SOIL GAS SAMPLE LOCATIONS</b>	
4TH AND GAMBELL ADDITIONAL SITE CHARACTERIZATION Anchorage, Alaska	
DATE: JUNE 2010	CHKD: B.J.M.
DRAWN: C.E.H.	PROJ. No.: 14-174
825 W. 8th Ave., Anchorage, AK 99501, (907) 258-4880	





NOT TO SCALE



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 PROJ. No.: 14-174  
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 AK 99501, (907) 258-4880

## LEAK DETECTION SCHEMATIC

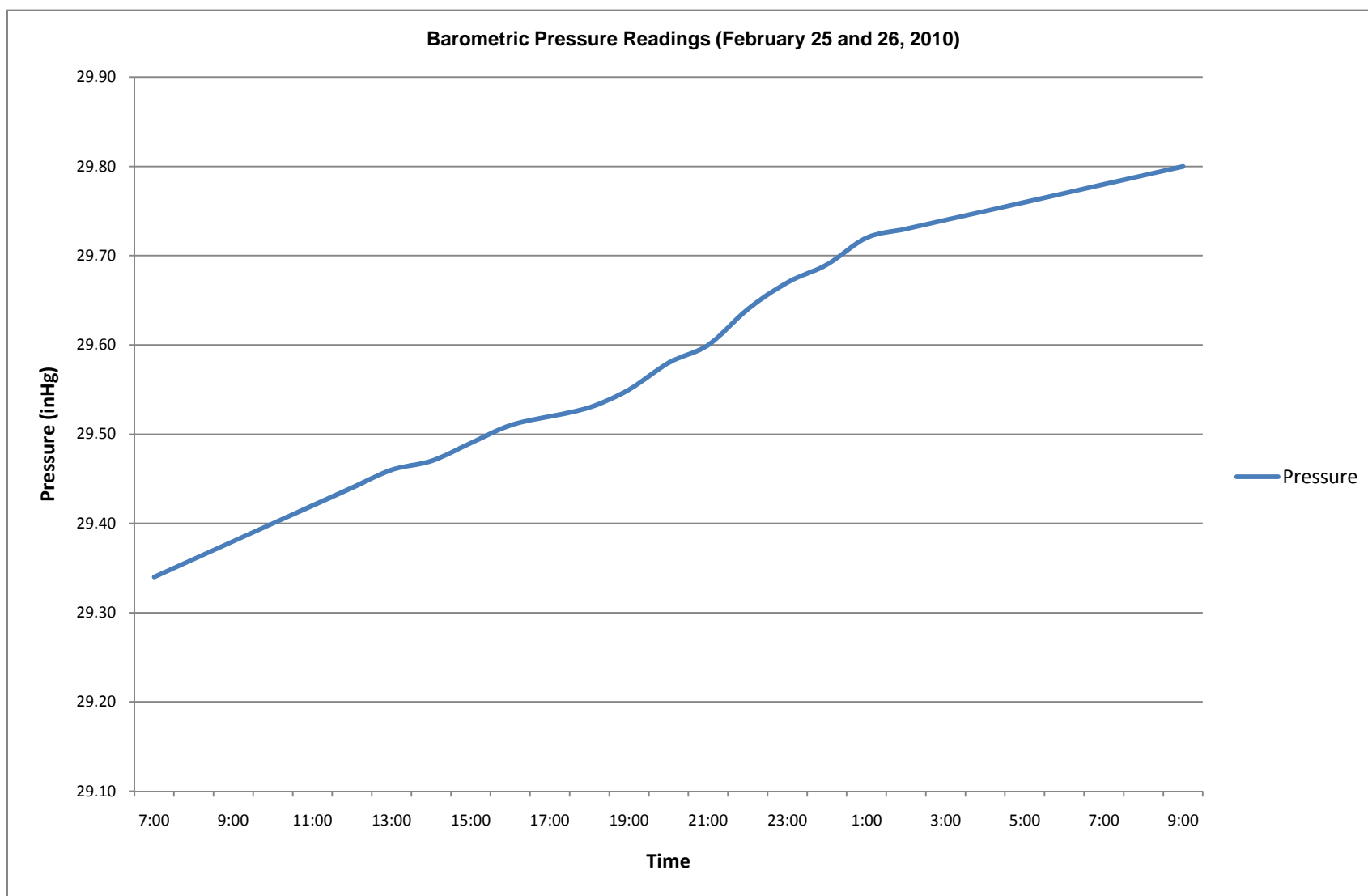
4TH AND GAMBELL  
 ADDITIONAL SITE CHARACTERIZATION  
 Anchorage, Alaska

FIGURE

5



**Figure 6. Barometric Pressure Readings - February 2010**  
**4th and Gambell Additional Site Characterization**





DATE: JUNE 2010  
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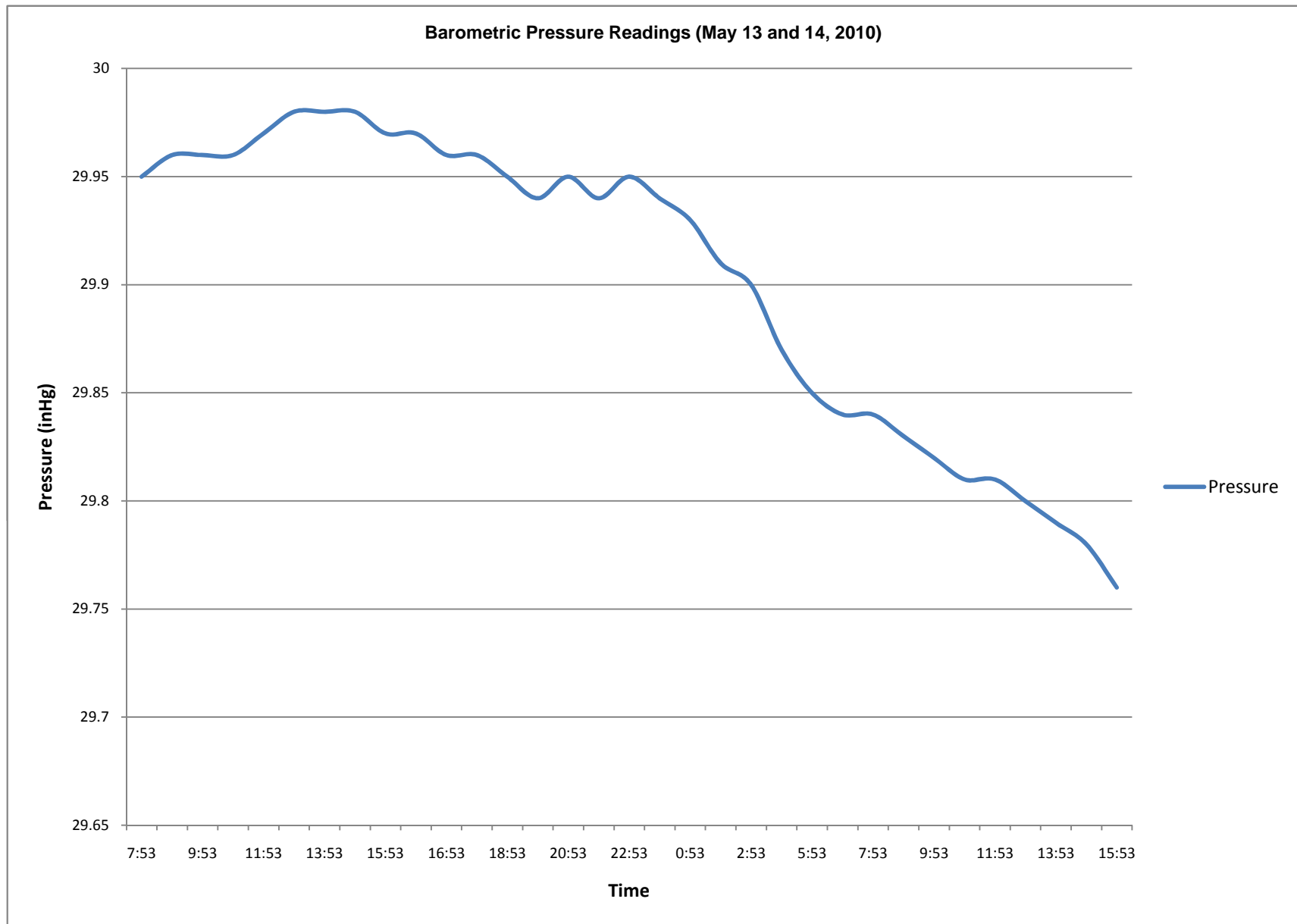
## ANALYTICAL RESULTS (FEBRUARY 2010)

4TH AND GAMBELL  
ADDITIONAL SITE CHARACTERIZATION  
Anchorage, Alaska

FIGURE

7

**Figure 8. Barometric Pressure Readings - May 2010**  
**4th and Gambell Additional Site Characterization**





DATE: JUNE 2010  
CHKD: B.J.M.  
DRAWN: C.E.H.  
PROJ. No.: 14-174  
825 W. 8th Ave., Anchorage,  
AK 99501, (907) 258-4880

## ANALYTICAL RESULTS (MAY 2010)

4TH AND GAMBELL  
ADDITIONAL SITE CHARACTERIZATION  
Anchorage, Alaska

FIGURE

9

## **APPENDIX A**

### **Field Notes**

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② 2/25/10

4AG

14-174

1230 Sample location: SG-2

- manifold leak check - OK
- (-15 in. Hg for 1 minute)
- soil gas monitoring point leak check - OK
- (10 min. purge @ 200 ml/min)
- He in hood  $> 60\%$
- Tedlar bag
- He = 0 ppm
- Hex = 85 ppm
- O<sub>2</sub> = 20.4 %
- CO<sub>2</sub> = 0.6 %
- Collect sample in summa canister
- w/30 min. flow controller from 1240-1310.

1320 Sample location: SG-1

- manifold leak check - OK
- (-15 in. Hg for 1 minute)
- soil gas monitoring point leak check - OK
- (10 min. purge @ 200 ml/min)
- He in hood  $> 70\%$
- Tedlar bag
- He = 0 ppm
- Hex = 90 ppm
- O<sub>2</sub> = 20.9 %
- CO<sub>2</sub> = 0.2 %
- Collect samples in summa canisters
- w/30 min. flow controllers from 1410-1440

③

2/25/10

4AG

14-174

1540 Sample location: SG-3

- manifold leak check - OK (-15 in. Hg for 1 min.)
- soil gas monitoring point leak check - OK
- (10 min. purge @ 200 ml/min)
- He in hood  $> 60\%$
- Tedlar bag
- He = 0 ppm
- Hex = 45 ppm
- O<sub>2</sub> = 20.9 %
- CO<sub>2</sub> = 0.4 %
- Collect sample in summa canister
- w/30 min. flow controller from 1555-1625
- Sample 104AG111SG
- Summa # 36464

1640 Sample location: SG-4

- manifold leak check - OK (-15 in. Hg for 1 min.)
- soil gas monitoring point leak check - OK
- (10 min. purge @ 200 ml/min)
- He in hood  $> 60\%$
- Tedlar bag - He = 0 ppm
- Hex = 100 ppm
- O<sub>2</sub> = 20.9 %
- CO<sub>2</sub> = 0.8 %
- Collect sample in summa canister
- w/30 min. flow controller from 1655-1725
- Sample 104AG112SG
- Summa # 31768

2/25/10



④

2/26/10

4 AG

14-174

0800 OASIS FVAN BURECH arrived  
@ site and retrieve summa  
canister SSS1 (sample 104AG101AA)  
0805 Retrieve summa canister 02327  
(sample 104AG102IA)  
0810 Retrieve summa canister 34025  
(sample 104AG103IA) and  
canister 21073 (104AG104IA),  
the field duplicate.  
0815 Retrieve summa canister ~~21073~~ 34727  
(sample 104AG106 CS)  
0817 Retrieve summa canister 25238  
(sample 104AG105AA)  
0820 Retrieve summa canister 5654  
(sample 104AG107CS)

~~2/26/10  
BURECH~~

2/26/10

4 AG

14-174

⑤

Sample Summary

104 AG	DATE	TIME	Location	Analysis	Canister
101 AA	2/26	0800	4th AA-1	TO-15 SUM	SSS1
102 IA	2/26	0805	1A-2	TO-15 SUM	02327
103 IA	2/26	0810	1A-1	TO-15 SUM	34025
104 IA	2/26	0812	1A-1 (Dup)	TO-15 SUM	21073
106 CS	2/26	0815	CS-1	TO-15 SUM	34722
105 AA	2/26	0817	AA-2	TO-15 SUM	25238
107 CS	2/26	0820	CS-2	TO-15 SUM	5655
108 SG	2/25	1310	SG-2	TO-15	37292
109 SG	2/25	1440	SG-1	TO-15	12375
110 SG	2/25	1445	SG-1 (Dup)	TO-15	30824
111 SG	2/25	1625	SG-3	TO-15	36464
112 SG	2/25	1725	SG-4	TO-15	31768

~~2/26/10  
BURECH~~

⑥

3/3/10

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Wet Weather Ditch for Feb Sampling

14174

Date	Time	Temp	Wet Weather Ditch for Feb Sampling	Obs	Loc	Temp	Loc
2/25	0700	26.6	29.34	2126	2800	19.9	Less
	0800	26.1	29.36	2600	19.0	29.77	
	0900	26.1	29.38	2700	19.0	29.78	
	1000	26.1	29.40	2800	18.0	29.79	
	1100	26.6	29.42	2900	18.0	29.80	
	1200	28.0	29.44				
	1300	28.9	29.46				
	1400	28.4	29.47				
	1500	28.9	29.49				
	1600	30.0	29.51				
	1700	28.9	29.52				
	1800	28.9	29.53				
	1900	28.0	29.55				
	2000	26.1	29.58				
	2100	28.0	29.60				
	2200	25.0	29.64				
	2300	23.0	29.67				
	2400	21.9	29.69				
	0100	21.0	29.72				
	0200	19.4	29.73				
	0300	19.9	29.74				
	0400	19.9	29.75				

4/27/10

Passive Soil Gas Sampling

0830 Ashley Hansen and David  
Hammons site

Location	Mod. ID	Time	Comments
A-1	62383	0909	
B-1	62389	0915	
C-1	62384	0920	
D-1	62385	0930	didn't get down far enough + could not out.
E-1	62386	0940	
F-1	62386	0947	
G-1	62386	0950	
G-1	62386	0950	Duplicate
G-2	62385	0958	
G-3	62385	1000	
G-3	62385	1009	
E-2	62384	1010	
D-2	62384	1021	
G-2	62384	1030	
B-2	62386	1405	
A-2	62389	1035	

→

4/27/10

Location	Module ID	Time	Comments	Location	Module ID	Time	Comments
A-3	623185	1045		B-5	623867	1433	
B-3	623191	1050		B-5	623861	1433	Duplicate
C-3	623846	1100		B-6	623855	1437	
C-3	623852	1100	Duplicate	B-7	623849	1440	
D-3	623858	1110		A-7	623843	1445	
F-3	623864	1115		A-5	623188	1450	
E-3	623870	1125		A-6	623182	1454	
G-5	623871	1140		H-3	623874	1504	
G-6	623865	1148		H-2	623880	1508	
G-7	623859	1153		H-1	623886	1510	
F-5	623853	1200		I-1	623892	1514	
F-6	623847	1204		J-1	623898	1517	Duplicate
E-5	623192	1205		J-1	623904	1517	
E-6	623186	1210		K-1	623910	1523	
E-6	623180	1210	Duplicate	I-2	623916	1528	
E-7	623181	1222		I-3	623917	1545	
F-7	623187	1225		J-2	623911	1547	
D-7	623193	1245		J-3	623905	1550	
<del>D-7</del>	<del>623848</del>	<del>1247</del>		K-2	623899	1555	moved to the 50' 2ft
D-5	623854	1250		L-1	623893	1602	
C-5	623866	1410		M-1	623887	1607	
C-6	623872	1415		M-2	623881	1615	
C-7	623873	1420		M-3	623875	1620	
				M-3	623876	1620	Duplicate

4/27/10

4/27/10 Location	module ID	Time	Comments
M-5	623882	1630	
M-6	623888	1640	
M-7	623894	1645	
L-5	623900	1647	
L-6	623906	1650	
L-7	623912	1702	
K-6	623918	1705	
K-7	623919	1708	
K-5	623913	1710	
H-5	623907	1720	
H-5	623901	1720	Duplicate
H-6	623895	1725	
H-7	623889	1730	MOVED ~ 3.0 ft + (gas to line)
I-7	623883	1735	
Left site @		1745	
4/27/10 AS/MS/TH			

4/28/10

Location	module ID	Time	Comments
A-8	623877	0850	
A-9	623878	0855	
A-10	623884	0900	
A-11	623890	0905	
A-12	623896	0908	
A-13	623902	0910	
B-13	623908	0915	
B-13	623914	0915	Duplicate
B-12	623920	0917	
B-11	623921	0920	
B-10	623915	0930	MOVED ~ 3 ft to the SE
B-9	623909	0932	
B-8	623903	0934	
C-8	623897	0935	
C-9	623891	0937	
C-10	623885	0948	MOVED ~ 3 ft to E
C-11	623879	0952	Shallow

Day 2 of Passive Soil Gas

Sampling

0830 Ashly Hansen and Ben Martich on site

→

4/28/10

4/28/10 @ 200 Zack Kirk replaced Ben

Location	modul ID	Time	Comments
C-N 12	623968	0957	(shallow)
C-N 12	623958	0957	↓ Duplicate
C-13	623952	1000	
P-13	623946	1004	
D-12	623940	1008	
B-11	623934	1010	
D-10	623928	1015	
P-9	623922	1020	
D-8	623923	1022	
E-8	623929	1025	
E-9	623935	1030	
<del>E-9</del>	<del>623941</del>		
E-10	623941	1035	Duplicate
E-10	623947	1035	Duplicate
E-11	623953	1037	
E-12	623959	1040	
E-13	623969	1045	
F-13	623970	1050	Wet
F-12	623960	1055	shallow
F-11	623954	1100	shallow
F-10	623948	1103	shallow
F-9	623944	1110	shallow
F-8	623936	1112	
G-18	623930	1110	
G-18	623924	1116	Duplicate

Location	modul ID	Time	Comments
G-9	623971	1120	shallow
G-10	623961	1123	
G-11	623955	1133	shallow
G-12	623949	1135	
G-13	623943	1137	
H-13	623937	1255	
H-12	623931	1257	
H-11	623925	1307	
H-10	623972	1320	shallow
H-9	623962	1330	
H-9	623956	1330	Duplicate
H-8	623950	1333	
I-8	623944	1352	
I-9	623938	1400	
J-9	623932	1405	shallow
J-8	623926	1407	
I-10	623973	1410	
I-11	623963	1420	
I-12	623957	1430	
I-13	623951	1445	
J-13	623945	1452	
J-13	623939	1452	Duplicate
J-12	623933	1455	
J-11	623927	1505	



4/28/10 4AG 14-174

Location	module ID	time	comment
J-10	624010	1510	
K-8	624010	1512	
K-9	624004	1515	
K-10	623998	1520	
K-11	623992	1524	
K-12	623986	1530	
K-13	623980	1533	
L-13	623974	1535	
L-13	623975	1535	dup.
L-12	623981	1540	
L-11	623987	1542	
L-10	623993	1545	
L-9	623999	1547	
L-8	624005	1550	
M-8	624011	1554	
M-9	624017	1556	
M-10	624018	1600	
M-11	624012	1604	wet
M-12	624006	1606	
M-13	624000	1610	

Left site @ 1630

Jaguar Hunt 4/28/10

4/29/10 4AG 14-174

0830 Jan L-m and Ashley Hansen  
on-site. Hand digging tree row  
41.

Location	module ID	Time	comment
A-4	623994	0902	
B-4	623988	0945	
C-4	623982	1010	
D-4	623976	1037	
E-4	623977	1110	
F-4	623983	1130	
G-4	623989	1430	
G-4	623995	1430	Duplicate
H-4	624001	1440	
I-4	624007	1455	
J-4	624013	1530	
K-4	624019	1535	
L-4	623984	1706	
M-4	623978	1640	

Left site @ 1715

Jaguar Hunt  
4/29/10Timed duplicates 30 min later than  
primary sample on CCR added to the number

5/12/10	4AG	14174	
Collecting passive soil Gas samples			
0900 Bare Delaney and Ashby Hansen on site			
Location	module ID	Time	Comment
A-1	623183	0910	
B-1	623184	0912	
C-1	623844	0914	
D-1	623856	0915	
E-1	623862	0916	
F-1	623868	0918	
G-1	623869	0920	
G-1	623863	0920	Duplicate
G-2	623857	0923	
F-2	623845	0925	
E-2	623190	0934	
D-2	623184	0936	
C-2	623178	0940	
B-2	623860		
A-2	623179	0942	
A-3	623185	0945	
B-3	623891	0947	
C-3	623846	0950	
D-3	623852	0950	Duplicate
		Agitation 5/12/10	

5/12/10	4AG	14174	
Collecting passive soil Gas samples			
0900 Bare Delaney and Ashby Hansen on site			
Location	module ID	Time	Comment
E-3	623870	1000	
D-3	623858	1015	
F-3	623864		whisker has moved coil not find probe
G-3	623851	1016	
G-5	623871	1017	
G-6	623865	1020	
G-7	623859	1023	
F-7	623187	1025	
E-7	623181	1027	
D-7	623193	1028	
C-7	623873	1030	
B-7	623849	1034	
A-7	623843	1035	
A-6	623182	1037	
A-5	623188	1038	
B-6	623855	1040	cont not find probe
B-5	623861	1040	Duplicate
B-5	623867	1040	
C-5	623866	1045	
C-6	623872	1046	
D-6	623848	1050	
D-5	623854	1051	
E-5	623192	1054	
E-6	623186	1055	
E-6	623180	1055	Duplicate
		Agitation 5/12/10	

Location	Module ID	Time	14-174	14-174
F-6	623847	1055	comment	
F-5	623853	1100		
H-3	623874	1102		
H-2	623880 →	—	string broke w/ pulling out	
H-1	623886	1110		
T-1	623892	1112		
J-1	623898	1114		
J-1	623904	1114		
K-1	623940	1115		
K-2	623899	1120		
J-2	623911	1121		
J-3	623905	1122		
T-3	623917	1123		
I-2	623916	1124		
L-1	623893	1130		
M-1	623887	1131		
M-2	623881	1132		
M-3	623875	1134		
M-3	623876	1134	Disc	
M-5	623882	1136		
M-6	623888	1140		
M-7	623894	1143		
L-7	623912	1145		
L-6	623906	1147		
L-5	623900	1150		
Asbury Home 5/12/10				

Location	Module ID	Time	14-174	14-174
K-5	623913	1151		comment
K-6	623918	1152		
K-7	623919	1154		
T-7	623883	1157		
H-7	623889	1200		
H-6	623895	1202		
H-5	623901	1206		duplicate
H-5	623907	1206		
A-8	623877	1310		
A-9	623878	1312		
A-10	623884	1314		
A-11	623890	1316		
A-12	623896	1320		
A-13	623902	1321		
B-13	623908	1322		
B-13	623914	1322		duplicate
B-12	623920	1325		
B-11	623921	1327		
B-10	623915	1330		
B-9	623909	1331		
B-8	623903	1332		
C-8	623897	1335		
C-9	623891	1337		
C-10	623885	1340		
C-11	623879	1341		
Asbury Home 5/12/10				



Location	YA6 module ID	Time	Comments
C-12	623908	1342	
C-12	623958	1342	Dup
C-13	623952	1345	
D-13	623946	1358	
D-12	623940	1400	
D-11	623934	1401	
D-10	623928	1403	
D-9	623922	1405	
D-8	623923	1406	
E-8	623929	1407	
E-9	623935	1408	
E-10	623941	1410	
E-16	623947	1410	Duplicate
E-11	623953	1412	
E-12	623959	1414	
E-13	623969	1416	
F-13	623970	1420	
F-12	623960	1421	
F-11	623954	1422	
F-10	623948	1425	
F-9	623947	1426	
F-8	623936	1430	
G-8	623930	1435	
G-8	623924	1435	Dup
G-9	623971	1437	

Assembly

5/12/10

Location	YA6 module ID	Time	Comments
G-10	623961	1440	
G-11	623955	1442	
G-12	623949	1443	
G-13	623943	1445	
H-13	623937		Puck broke when pulling string
H-12	623931	1453	
H-11	623925	1455	
H-10	623972	1457	
H-9	623962	1500	
H-9	623956	1500	Dup
H-8	623950	1501	
I-8	623944	1506	
I-9	623938	1505	
J-9	623932	1508	
J-8	623926	1507	
I-10	623973	1509	
I-11	623963	1512	
I-12	623957	1516	
I-13	623951	1517	
J-13	623945	1520	
J-13	623939	1520	Dup
J-12	623933	1522	
J-11	623927	1524	
J-10	624016	1525	

Assembly 5/12/10

14-174

Comment

4461

Time

Module

Location

K-8	624010	1527	
K-9	624004	1530	
K-10	623998	1531	
K-11	623992	1532	
K-12	623986	1534	
K-13	623980	1535	
L-13	623974	1537	
L-13	623975	1537	Dup
L-12	623981	1540	
L-11	623987	1541	
L-10	623993	1545	
L-9	623999	1546	
L-8	624005	1547	
M-8	624011	1548	
M-9	624017	1549	
M-10	624018	1550	
M-11	624012	1552	
M-12	624006	1553	
M-13	624000	1554	
M-4	623978	1604	
L-4	623984	1605	
K-4	623974	1606	
J-4	624013	1607	
I-4	624007	1610	
H-4	624001	1611	

5/12/10  
Army Hq

5/12/10

Location

Module

Time

14-174

Comments

G-4	623989	1612	
G-4	623995	1612	Dup
F-4	623983	1615	
E-4	623977	1616	
D-4	623976	1617	
C-4	623982	1619	
B-4	623988	1620	
A-4	623994	1622	

Left site @ 1645 to pick up  
sampling equipment at Alaska  
Airlines Air Cargo.

Returned to the office @ 1730  
and unpacked truck.

Army Hq  
5/12/10

5/13/10

UAG

14-174

0935 OASIS Ben Merbach, Ashley Hansen, Zack Kirk

arrive at the site. Plan for today is

to set out indoor/outdoor/ambient space

air samples and also collect soil/gas

samples. Tom reviews HSE plan &amp;

activities for the day. Weather is

550 and mostly cloudy.

0945 Set out outdoor air at AA-1.

Canister ID is 34181.

24-hour flow regulator

Analyzed TO-15 SIM

Sample ID is 104AG114AA

0950 Set out outdoor air sample at AA-2.

Canister ID is 34748

24-hour flow regulator.

Analysis for TO-15 SIM.

Sample ID is 104AG115AA

1000 Set out indoor air sample at IA-2

Canister ID is 25267

Analysis for TO-15 SIM

Sample ID is 104AG116AA

1005 Set out indoor air sample at DA-1

Canister ID is 11879

Analysis for TO-15 SIM, Sample ID

is 104AG117AA

..

Run sample

14-174

UAG

5/13/10

Also, set out duplicate sample

Canister ID is 33888

Analysis for TO-15 SIM

Sample ID is 104AG118AA

Time noted as 1010

1020 Set out ambient space sample at CS-1

Canister ID is 34011

Analysis for TO-15 SIM

Sample ID is 104AG119CS

1025 Set out ambient space sample at CS-2

Canister ID is 10661

Analysis for TO-15 SIM

Sample ID is 104AG120CS.

1050 Set at SG-1.

Pass manifold leak check.

Begin monitoring point leak check

Helium = 0 ppm

O<sub>2</sub> = 20.9%CO<sub>2</sub> = 0.29%

TVH = 110 ppm

1220 Begin collecting sample 104AG-121SG

30 minute flow controller.

Canister ID is 12808

Z. Merbach  
5/13/10

5/13/10 4AG 14174

1420 Set @ SG-4  
manifold leak test - pass  
Begin monitoring point leak check  
Helium = 0 ppm  
O<sub>2</sub> = 20.9%  
CO<sub>2</sub> = 0.7%  
TVH = 150 ppm

1445 Begin collecting sample  
104AG 124SG  
30 minute flow controller  
canister ID = 13389

1515 Stopped sample  
1525 Haded back to office to  
unload equipment.

Agathon 5/13/10

5/13/10 4AG 14-174

1250 End Sample collection @  
AGS-1 Final VAC - 8" mg

1300 Set @ SG-2  
manifold leak test - pass  
Begin monitoring test point leak check  
Helium = 0 ppm  
O<sub>2</sub> = 20.9%  
CO<sub>2</sub> = 0.6%  
TVH = 140 ppm

1340 Begin collecting sample  
104AG 122SG  
30 minute flow controller  
canister ID is 36480


1310 End Sample collection @ SG-2

1345 Set @ SG-3  
manifold leak test - pass  
Begin monitoring point leak  
check  
Helium = 0 ppm  
O<sub>2</sub> = 20.9%  
CO<sub>2</sub> = 0.5%  
TVH = 110 ppm

1415 Begin collecting sample 104AG 123SG  
30 minute flow controller  
canister ID = 36405

5/13/10 Agathon

5/14/10	4AG	14-174
Back Kirk and Ashby Hansen arrived onsite @ 0930 to collect Summa canisters (24 hours samples)		
0920	collected AA1	
	sample ID = 104AG114AA	
	final vac = -5.0"mg	
0925	collected AA2	
	sample ID = 104AG115AA	
	final vac = 0	
0927	collected CS-2	
	sample ID = 10AG120CS	
	final vac = -5"mg	
0928	collected CS-1	
	sample ID = 10AG119CS	
	final vac = -2.5"mg	
1060	collected 1A-2	
	sample ID = 10AG116A	
	final vac = -1.9"mg	
1005	collected 1A-1	
	sample ID = 10AG117A	
	duplicate ID = 10AG118A	
	final vac (117) = 0	
	final vac (118) = -4"mg	
0940	dropped off Ke v @	13362 <sup>nd</sup>
	Ashby Han	5/14/10

5/14/10	4AG	14-174
1115 preparing the samples for shipment.		
Trip Blanks		
	Box 1 - 62400Z	
	Box 2 - 623990	
	Box 3 - 623996	
	Box 4 - 624008	
1400 Delivered package to FedEx		
		
	Ashby Han	5/14/10

May 24/10

Sample Summary

ID	Site	Time	Location	Grinder	Grinder	Final Vol	Analysis
1154A	5113	0945	AA-1	34181	28.5	0	TO-15 SIM
1167A		0950	AA-2	34748	24.5	0	
1177A		1000	IA-2	05267	28	18.5	
1187A		1005	IA-1	11879	27.5	0	
1197A		1010	IA-2	33888	37	3	close of 1170A
119CS		1020	CS-1	34011	29	2	
120CS		1025	CS-2	10661	29	4.5	
121SC		1220	SG-1	12808	30	8	
122SC		1340	SG-2	36480	30	12	
123SC		1415	SG-3	36405	30	8	
124SC		1445	SG-4	13389	30	6	
125TB		-	-	9559	-	-	Top Blank

*SPM* 5/17/10

## **APPENDIX B**

### **Photographs**

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**Photographs**  
**4<sup>th</sup> and Gambell Additional Characterization**



Photograph 1. February ambient air sample AA-2.



Photograph 2. February crawl space air sample CS-1.

## Photographs 4<sup>th</sup> and Gambell Additional Characterization



Photograph 3. February soil gas sample SG-3.



Photograph 4. Drilling passive soil gas monitoring points in April.



**Photographs**  
**4<sup>th</sup> and Gambell Additional Characterization**



Photograph 5. Drilling passive soil gas monitoring points in April.

**Photographs**  
**4<sup>th</sup> and Gambell Vapor Intrusion Assessment**



Photograph 6. Hand digging module boring at B-4 because of nearby utilities.

## Photographs 4<sup>th</sup> and Gambell Vapor Intrusion Assessment



Photograph 7. Preparing to insert passive soil gas sampling module.



Photograph 9. Inserting passive soil gas sampling module.

## **APPENDIX C**

### **Laboratory Analytical Reports**

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3/15/2010

Mr. Ben Martich  
Oasis Environmental, Inc.  
825 W. 8th Avenue  
Suite 200  
Anchorage AK 99501

Project Name: 4th and Gambell  
Project #: 14-174-2  
Workorder #: 1003039A

Dear Mr. Ben Martich

The following report includes the data for the above referenced project for sample(s) received on 3/2/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Lopez at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Lopez  
Project Manager




**WORK ORDER #: 1003039A**

Work Order Summary

<b>CLIENT:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501	<b>BILL TO:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501
<b>PHONE:</b>	907-258-4880	<b>P.O. #</b>	
<b>FAX:</b>		<b>PROJECT #</b>	14-174-2 4th and Gambell
<b>DATE RECEIVED:</b>	03/02/2010	<b>CONTACT:</b>	Karen Lopez
<b>DATE COMPLETED:</b>	03/15/2010		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	104AG101AA	Modified TO-15 SIM	3.5 "Hg	5 psi
01AA	104AG101AA Lab Duplicate	Modified TO-15 SIM	3.5 "Hg	5 psi
02A	104AG102IA	Modified TO-15 SIM	9.0 "Hg	5 psi
03A	104AG103IA	Modified TO-15 SIM	6.0 "Hg	5 psi
04A	104AG104IA	Modified TO-15 SIM	7.0 "Hg	5 psi
05A	104AG105AA	Modified TO-15 SIM	8.5 "Hg	5 psi
06A	104AG106CS	Modified TO-15 SIM	3.5 "Hg	5 psi
07A	104AG107CS	Modified TO-15 SIM	4.0 "Hg	5 psi
13A	104AG113TB	Modified TO-15 SIM	28.5 "Hg	5 psi
14A	Lab Blank	Modified TO-15 SIM	NA	NA
15A	CCV	Modified TO-15 SIM	NA	NA
16A	LCS	Modified TO-15 SIM	NA	NA

CERTIFIED BY:



Laboratory Director

DATE: 03/15/10

Certification numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,  
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719

Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,

Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630  
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE  
Modified TO-15 SIM  
Oasis Environmental, Inc.  
Workorder# 1003039A**

Eight 6 Liter Summa Canister (SIM Certified) samples were received on March 02, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
ICAL %RSD acceptance criteria	$\leq 30\%$ RSD with 2 compounds allowed out to $< 40\%$ RSD	Project specific; default criteria is $\leq 30\%$ RSD with 10% of compounds allowed out to $< 40\%$ RSD
Daily Calibration	$\pm 30\%$ Difference	Project specific; default criteria is $\leq 30\%$ Difference with 10% of compounds allowed out up to $\leq 40\%$ .; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

**Receiving Notes**

There were no receiving discrepancies.

**Analytical Notes**

Dilution was performed on sample 104AG107CS due to the presence of high level non-target species.

**Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

## Summary of Detected Compounds MODIFIED EPA METHOD TO-15 GC/MS SIM

**Client Sample ID: 104AG101AA**

**Lab ID#: 1003039A-01A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.030	0.038	0.21	0.26

**Client Sample ID: 104AG101AA Lab Duplicate**

**Lab ID#: 1003039A-01AA**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.030	0.034	0.21	0.23

**Client Sample ID: 104AG102IA**

**Lab ID#: 1003039A-02A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.038	7.6	0.26	51

**Client Sample ID: 104AG103IA**

**Lab ID#: 1003039A-03A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.034	1.2	0.23	8.3

**Client Sample ID: 104AG104IA**

**Lab ID#: 1003039A-04A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.035	1.3	0.24	9.1

**Client Sample ID: 104AG105AA**

**Lab ID#: 1003039A-05A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Trichloroethene	0.037	0.43	0.20	2.3
Tetrachloroethene	0.037	0.074	0.25	0.50

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**Summary of Detected Compounds**  
**MODIFIED EPA METHOD TO-15 GC/MS SIM**

**Client Sample ID: 104AG106CS**

**Lab ID#: 1003039A-06A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.015	0.022	0.039	0.055
Tetrachloroethene	0.030	8.5	0.21	57

**Client Sample ID: 104AG107CS**

**Lab ID#: 1003039A-07A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Tetrachloroethene	0.16	1.8	1.0	12

**Client Sample ID: 104AG113TB**

**Lab ID#: 1003039A-13A**

No Detections Were Found.

Client Sample ID: 104AG101AA

Lab ID#: 1003039A-01A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030612sim</b>	<b>Date of Collection:</b> 2/26/10 8:00:00 AM
<b>Dil. Factor:</b>	<b>1.52</b>	<b>Date of Analysis:</b> 3/6/10 03:04 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
Tetrachloroethene	0.030	0.038	0.21	0.26
trans-1,2-Dichloroethene	0.15	Not Detected	0.60	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: 104AG101AA Lab Duplicate

Lab ID#: 1003039A-01AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	e030613sim	Date of Collection: 2/26/10 8:00:00 AM
Dil. Factor:	1.52	Date of Analysis: 3/6/10 03:47 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
Tetrachloroethene	0.030	0.034	0.21	0.23
trans-1,2-Dichloroethene	0.15	Not Detected	0.60	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	98	70-130



Client Sample ID: 104AG102IA

Lab ID#: 1003039A-02A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030614sim</b>	<b>Date of Collection:</b> 2/26/10 8:05:00 AM
<b>Dil. Factor:</b>	<b>1.91</b>	<b>Date of Analysis:</b> 3/6/10 04:24 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.019	Not Detected	0.049	Not Detected
cis-1,2-Dichloroethene	0.038	Not Detected	0.15	Not Detected
Trichloroethene	0.038	Not Detected	0.20	Not Detected
Tetrachloroethene	0.038	7.6	0.26	51
trans-1,2-Dichloroethene	0.19	Not Detected	0.76	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: 104AG103IA

Lab ID#: 1003039A-03A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030615sim</b>	<b>Date of Collection:</b> 2/26/10 8:10:00 AM
<b>Dil. Factor:</b>	<b>1.68</b>	<b>Date of Analysis:</b> 3/6/10 05:12 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.017	Not Detected	0.043	Not Detected
cis-1,2-Dichloroethene	0.034	Not Detected	0.13	Not Detected
Trichloroethene	0.034	Not Detected	0.18	Not Detected
Tetrachloroethene	0.034	1.2	0.23	8.3
trans-1,2-Dichloroethene	0.17	Not Detected	0.67	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	98	70-130

Client Sample ID: 104AG104IA

Lab ID#: 1003039A-04A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030616sim</b>	<b>Date of Collection:</b> 2/26/10 8:30:00 AM
<b>Dil. Factor:</b>	<b>1.75</b>	<b>Date of Analysis:</b> 3/6/10 05:49 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.018	Not Detected	0.045	Not Detected
cis-1,2-Dichloroethene	0.035	Not Detected	0.14	Not Detected
Trichloroethene	0.035	Not Detected	0.19	Not Detected
Tetrachloroethene	0.035	1.3	0.24	9.1
trans-1,2-Dichloroethene	0.18	Not Detected	0.69	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	99	70-130

Client Sample ID: 104AG105AA

Lab ID#: 1003039A-05A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030617sim</b>	<b>Date of Collection:</b> 2/26/10 8:17:00 AM
<b>Dil. Factor:</b>	<b>1.87</b>	<b>Date of Analysis:</b> 3/6/10 06:26 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.019	Not Detected	0.048	Not Detected
cis-1,2-Dichloroethene	0.037	Not Detected	0.15	Not Detected
Trichloroethene	0.037	0.43	0.20	2.3
Tetrachloroethene	0.037	0.074	0.25	0.50
trans-1,2-Dichloroethene	0.19	Not Detected	0.74	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: 104AG106CS

Lab ID#: 1003039A-06A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030618sim</b>	<b>Date of Collection:</b> 2/26/10 8:15:00 AM
<b>Dil. Factor:</b>	<b>1.52</b>	<b>Date of Analysis:</b> 3/6/10 07:02 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.015	0.022	0.039	0.055
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
Tetrachloroethene	0.030	8.5	0.21	57
trans-1,2-Dichloroethene	0.15	Not Detected	0.60	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: 104AG107CS

Lab ID#: 1003039A-07A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030619sim</b>	<b>Date of Collection:</b> 2/26/10 8:20:00 AM
<b>Dil. Factor:</b>	<b>7.75</b>	<b>Date of Analysis:</b> 3/6/10 07:38 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.078	Not Detected	0.20	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.61	Not Detected
Trichloroethene	0.16	Not Detected	0.83	Not Detected
Tetrachloroethene	0.16	1.8	1.0	12
trans-1,2-Dichloroethene	0.78	Not Detected	3.1	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: 104AG113TB

Lab ID#: 1003039A-13A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030620sim</b>	<b>Date of Collection:</b> 2/26/10
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 3/6/10 08:17 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	99	70-130



Client Sample ID: Lab Blank

Lab ID#: 1003039A-14A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030605sim</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 3/6/10 09:51 AM</b>

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: CCV

Lab ID#: 1003039A-15A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	e030602sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 3/6/10 07:47 AM

Compound	%Recovery
Vinyl Chloride	103
cis-1,2-Dichloroethene	100
Trichloroethene	99
Tetrachloroethene	96
trans-1,2-Dichloroethene	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: LCS

Lab ID#: 1003039A-16A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>e030603sim</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 3/6/10 08:28 AM</b>

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	96
cis-1,2-Dichloroethene	91
Trichloroethene	90
Tetrachloroethene	87
trans-1,2-Dichloroethene	91

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130



# CHAIN-OF-CUSTODY RECORD

## Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, state, federal, national, and international laws, regulations and ordinances of any jurisdiction. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.C.T. Hotline (800) 487-4922

180 BLUE RAVINE ROAD, SUITE B  
FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 1 of 2

Project Manager Bern Martich

Collected by: (Print and Sign) Ryan Burch / Ryan B.

Company OASIS Environmental Email b.martich@oasisenv.com

Address 825 W. 6th Ave City Anchorage State AK Zip 99501

Phone 907-258-4880 Fax \_\_\_\_\_

### Project Info:

F.O. # \_\_\_\_\_

Project # 14-174-2

Project Name 4th and Gambel

Turn Around Time: \_\_\_\_\_

☒ Normal

☐ Rush

Lab Use Only: Pressurized by: \_\_\_\_\_ Date: \_\_\_\_\_

Pressurization Gas: \_\_\_\_\_

specify N<sub>2</sub> He

Lab I.D. Field Sample I.D. (Location)

Can #

Date of Collection

Time of Collection

Analyses Requested

Canister Pressure/Vacuum

Initial

Final

Receipt

Final (lbs)

01A 1044G101AA

5551

2/26/10

0800

TO-15 SIM

-30

-7

02A 1044G102IA

02327

2/26/10

0805

TO-15 SIM

-30

-8

03A 1044G103IA

34025

2/26/10

0810

TO-15 SIM

-30

-7

04A 1044G104IA

21073

2/26/10

0830

TO-15 SIM

-30

-7.5

05A 1044G105AA

25238

2/26/10

0817

TO-15 SIM

-30

-10.5

06A 1044G106CS

34722

2/26/10

0815

TO-15 SIM

-30

-4

07A 1044G107CS

5655

2/26/10

0820

TO-15 SIM

-30

-4.5

1044G108SG

37292

2/25/10

1310

TO-15

-30

-4

1044G109SG

12375

2/25/10

1440

TO-15

-30

-10

1044G110SG

30824

2/25/10

1445

TO-15

-30

-10

Relinquished by: (signature) Bern Martich Date/Time 3/1/10 11:00

Received by: (signature) Mona Hagen Date/Time 3/1/10 9:00

Relinquished by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Received by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Relinquished by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Received by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Lab Shipper Name \_\_\_\_\_

Air Bill # \_\_\_\_\_

Temp (°C) \_\_\_\_\_

Condition \_\_\_\_\_

Custody Seals Intact? Yes

Work Order # \_\_\_\_\_

Use Only Red Ex

NA Good

Yes No None 1008038



# CHAIN-OF-CUSTODY RECORD

## Sample Transportation Notice

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FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 2 of 2

Project Manager Ben Martich

Collected by: (Print and Sign) Ryan Burch / Ben B. C.

Company CASIS Environmental Email bmartich@casisenvironment.com

Address 825 W. 8th Ave City Anchorage State AK Zip 99501

Phone 907-258-4880 Fax \_\_\_\_\_

### Project Info:

P.O. # \_\_\_\_\_

Project # 14-174-2

Project Name 4th & Gambell

Turn Around Time:

☒ Normal

☐ Rush

Lab Use Only: Pressurized by:

Date: \_\_\_\_\_

Pressurization Gas: \_\_\_\_\_

specify: \_\_\_\_\_ N<sub>2</sub> He

Lab I.D. Field Sample I.D. (Location)

Can #

Date of Collection

Time of Collection

Analyses Requested

Canister Pressure/Vacuum

Initial

Final

Receipt

Final (cell)

1844G1115G

36464 2/25/10

1625

TD-15

-30 -10

1844G1125G

31768 2/25/10

1725

TO-15

-30 -5

13A 1844G113TB

36043 2/26/10

---

TO-15 SIM

-30 ---

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Notes: Canister 36046 and 36048 associated flow controller was not used.

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Lab Shipper Name

Air Bill #

Temp. (°C)

Condition

Custody Seals Intact?

Work Order #

Use Only

red BN

NA

Good

Yes

No

None

1003033

3/15/2010

Mr. Ben Martich  
Oasis Environmental, Inc.  
825 W. 8th Avenue  
Suite 200  
Anchorage AK 99501

Project Name: 4th and Gambell  
Project #: 14-174-2  
Workorder #: 1003039B

Dear Mr. Ben Martich

The following report includes the data for the above referenced project for sample(s) received on 3/2/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Lopez at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Lopez  
Project Manager


**WORK ORDER #: 1003039B**

Work Order Summary

<b>CLIENT:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501	<b>BILL TO:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501
<b>PHONE:</b>	907-258-4880	<b>P.O. #</b>	
<b>FAX:</b>		<b>PROJECT #</b>	14-174-2 4th and Gambell
<b>DATE RECEIVED:</b>	03/02/2010	<b>CONTACT:</b>	Karen Lopez
<b>DATE COMPLETED:</b>	03/15/2010		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
08A	104AG108SG	Modified TO-15	5.2 "Hg	15 psi
09A	104AG109SG	Modified TO-15	10.4 "Hg	15 psi
10A	104AG110SG	Modified TO-15	10.4 "Hg	15 psi
11A	104AG111SG	Modified TO-15	10.0 "Hg	15 psi
12A	104AG112SG	Modified TO-15	5.4 "Hg	15 psi
13A	Lab Blank	Modified TO-15	NA	NA
14A	CCV	Modified TO-15	NA	NA
15A	LCS	Modified TO-15	NA	NA

CERTIFIED BY:



Laboratory Director

DATE: 03/15/10

Certification numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,  
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719

Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,

Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020



**LABORATORY NARRATIVE**  
**Modified TO-15**  
**Oasis Environmental, Inc.**  
**Workorder# 1003039B**

Five 1 Liter Summa Canister samples were received on March 02, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
Daily CCV	<= 30% Difference	<= 30% Difference; Compounds exceeding this criterion and associated data are flagged and narrated.
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

**Receiving Notes**

There were no receiving discrepancies.

**Analytical Notes**

There were no analytical discrepancies.

**Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

## Summary of Detected Compounds

### MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

**Client Sample ID: 104AG108SG**

**Lab ID#: 1003039B-08A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	4.9	1000	33	6800

**Client Sample ID: 104AG109SG**

**Lab ID#: 1003039B-09A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.5	24	10	160

**Client Sample ID: 104AG110SG**

**Lab ID#: 1003039B-10A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.5	24	10	160

**Client Sample ID: 104AG111SG**

**Lab ID#: 1003039B-11A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.5	4.1	10	28

**Client Sample ID: 104AG112SG**

**Lab ID#: 1003039B-12A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.2	39	8.3	260

Client Sample ID: 104AG108SG

Lab ID#: 1003039B-08A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030421</b>	<b>Date of Collection:</b> 2/25/10 1:10:00 PM
<b>Dil. Factor:</b>	<b>9.76</b>	<b>Date of Analysis:</b> 3/4/10 06:37 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	4.9	Not Detected	12	Not Detected
Tetrachloroethene	4.9	1000	33	6800
Trichloroethene	4.9	Not Detected	26	Not Detected
1,2-Dichloroethene (Total of cis/trans)	4.9	Not Detected	19	Not Detected

**Container Type: 1 Liter Summa Canister**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	91	70-130

Client Sample ID: 104AG109SG

Lab ID#: 1003039B-09A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030422</b>	<b>Date of Collection:</b> 2/25/10 2:40:00 PM
<b>Dil. Factor:</b>	<b>3.09</b>	<b>Date of Analysis:</b> 3/4/10 07:05 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	1.5	Not Detected	3.9	Not Detected
Tetrachloroethene	1.5	24	10	160
Trichloroethene	1.5	Not Detected	8.3	Not Detected
1,2-Dichloroethene (Total of cis/trans)	1.5	Not Detected	6.1	Not Detected

**Container Type: 1 Liter Summa Canister**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: 104AG110SG

Lab ID#: 1003039B-10A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030423</b>	<b>Date of Collection:</b> 2/25/10 2:45:00 PM
<b>Dil. Factor:</b>	<b>3.09</b>	<b>Date of Analysis:</b> 3/4/10 07:25 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	1.5	Not Detected	3.9	Not Detected
Tetrachloroethene	1.5	24	10	160
Trichloroethene	1.5	Not Detected	8.3	Not Detected
1,2-Dichloroethene (Total of cis/trans)	1.5	Not Detected	6.1	Not Detected

**Container Type: 1 Liter Summa Canister**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: 104AG111SG

Lab ID#: 1003039B-11A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030424</b>	<b>Date of Collection:</b> 2/25/10 4:25:00 PM
<b>Dil. Factor:</b>	<b>3.03</b>	<b>Date of Analysis:</b> 3/4/10 07:42 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	1.5	Not Detected	3.9	Not Detected
Tetrachloroethene	1.5	4.1	10	28
Trichloroethene	1.5	Not Detected	8.1	Not Detected
1,2-Dichloroethene (Total of cis/trans)	1.5	Not Detected	6.0	Not Detected

**Container Type: 1 Liter Summa Canister**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	96	70-130



Client Sample ID: 104AG112SG

Lab ID#: 1003039B-12A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030425</b>	<b>Date of Collection:</b> 2/25/10 5:25:00 PM
<b>Dil. Factor:</b>	<b>2.46</b>	<b>Date of Analysis:</b> 3/4/10 08:16 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
Tetrachloroethene	1.2	39	8.3	260
Trichloroethene	1.2	Not Detected	6.6	Not Detected
1,2-Dichloroethene (Total of cis/trans)	1.2	Not Detected	4.9	Not Detected

**Container Type: 1 Liter Summa Canister**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: Lab Blank

Lab ID#: 1003039B-13A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030407</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 3/4/10 11:28 AM</b>

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloroethene (Total of cis/trans)	0.50	Not Detected	2.0	Not Detected

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: CCV

Lab ID#: 1003039B-14A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030402</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 3/4/10 08:53 AM</b>

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	121
Tetrachloroethene	101
Trichloroethene	107
1,2-Dichloroethene (Total of cis/trans)	101

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	101	70-130

Client Sample ID: LCS

Lab ID#: 1003039B-15A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>p030403</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 3/4/10 09:27 AM</b>

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	122
Tetrachloroethene	93
Trichloroethene	98
1,2-Dichloroethene (Total of cis/trans)	97

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	102	70-130



# CHAIN-OF-CUSTODY RECORD

## Sample Transportation Notice

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FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 1 of 2

Project Manager

Ben Martich

Collected by: (Print and Sign)

Ryan Burich / Ryan B. 1

Company

OASIS Environmental

P.O. #

14-174-2

Address

825 W. 8th Ave

City

Anchorage

State

AK

zip

99501

Phone

907-258-4880

Fax

Project Name

4th and Gambel II

## Project Info:

Turn Around Time:

☒ Normal  
☐ Rush

Lab Use Only  
Pressurized by:

Date:

Pressurization Gas:

N<sub>2</sub>

specify

N<sub>2</sub>

He

Lab I.D.

Field Sample I.D. (Location)

Can #

Date of Collection

Time of Collection

Analyses Requested

Canister Pressure/Vacuum

Initial

Final

Receipt

Final (opt)

1044G101AA

SSS1

2/26/10

0800

TD-15 SIM

-30

-7

1044G102IA

02327

2/26/10

0805

TD-15 SIM

-30

-8

1044G103IA

34025

2/26/10

0810

TD-15 SIM

-30

-7

1044G104IA

21073

2/26/10

0830

TD-15 SIM

-30

-7.5

1044G105AA

25238

2/26/10

0817

TD-15 SIM

-30

-10.5

1044G106CS

34722

2/26/10

0815

TD-15 SIM

-30

-4

1044G107CS

5655

2/26/10

0820

TD-15 SIM

-30

-4.5

1044G108SG

37292

2/25/10

1310

TD-15

-30

-4

1044G109SG

12375

2/25/10

1440

TD-15

-30

-10

1044G110SG

30824

2/25/10

1445

TD-15

-30

-10

Relinquished by: (signature)

Ben Martich

Date/Time

3/1/10

11:00

Received by: (signature)

MONICA GARCIA

Notes: 3/2/10 9:00

Relinquished by: (signature)

Date/Time

Received by: (signature)

Date/Time

Relinquished by: (signature)

Date/Time

Received by: (signature)

Date/Time

Lab

Shipper Name

At Bill #

Temp (C)

Condition

Custody Seals Intact?

Work Order #

Use Only

Lead Ex

NA

Good

Yes

No

None

1003038



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FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 2 of 2

Phone 704-238-9880 Fax \_\_\_\_\_

Project Name 4<sup>th</sup> of Gambell

specify

Pressurization Gas:

The  
 10Form : 26970419

6/1/2010

Mr. Ben Martich

Oasis Environmental, Inc.

825 W. 8th Avenue

Suite 200

Anchorage AK 99501

Project Name: 4th + Gambell

Project #: 14-174

Workorder #: 1005429A

Dear Mr. Ben Martich

The following report includes the data for the above referenced project for sample(s) received on 5/18/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Lopez at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Lopez

Project Manager



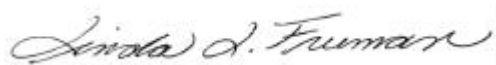
**WORK ORDER #: 1005429A**

Work Order Summary

<b>CLIENT:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501	<b>BILL TO:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501
<b>PHONE:</b>	907-258-4880	<b>P.O. #</b>	
<b>FAX:</b>		<b>PROJECT #</b>	14-174 4th + Gambell
<b>DATE RECEIVED:</b>	05/18/2010	<b>CONTACT:</b>	Karen Lopez
<b>DATE COMPLETED:</b>	06/01/2010		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	104AG114AA	Modified TO-15 SIM	0.6 "Hg	5 psi
02A	104AG115AA	Modified TO-15 SIM	0.6psi	5 psi
02AA	104AG115AA Lab Duplicate	Modified TO-15 SIM	0.6psi	5 psi
03A	104AG116IA	Modified TO-15 SIM	19.0 "Hg	5 psi
04A	104AG117IA	Modified TO-15 SIM	0.0 "Hg	5 psi
05A	104AG118IA	Modified TO-15 SIM	3.8 "Hg	5 psi
06A	104AG119CS	Modified TO-15 SIM	2.5 "Hg	5 psi
07A	104AG120CS	Modified TO-15 SIM	5.0 "Hg	5 psi
12A	104AG125TB	Modified TO-15 SIM	28.0 "Hg	5 psi
13A	Lab Blank	Modified TO-15 SIM	NA	NA
14A	CCV	Modified TO-15 SIM	NA	NA
15A	LCS	Modified TO-15 SIM	NA	NA

CERTIFIED BY:



Laboratory Director

DATE: 06/01/10

Certification numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,  
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719

Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,  
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630  
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE**  
**Modified TO-15 SIM**  
**Oasis Environmental, Inc.**  
**Workorder# 1005429A**

Eight 6 Liter Summa Canister (SIM Certified) samples were received on May 18, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
ICAL %RSD acceptance criteria	$\leq 30\%$ RSD with 2 compounds allowed out to $< 40\%$ RSD	Project specific; default criteria is $\leq 30\%$ RSD with 10% of compounds allowed out to $< 40\%$ RSD
Daily Calibration	$\pm 30\%$ Difference	Project specific; default criteria is $\leq 30\%$ Difference with 10% of compounds allowed out up to $\leq 40\%$ .; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

**Receiving Notes**

Sample 104AG116IA was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Despite the use of flow controllers for sample collection, the final canister vacuums for samples 104AG115AA and 104AG117IA were measured at ambient pressure in the field. These ambient pressure readings were confirmed by the laboratory upon sample receipt.

**Analytical Notes**

Dilution was performed on samples 104AG119CS and 104AG120CS due to the presence of high level non-target species.

**Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction)

not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

## Summary of Detected Compounds MODIFIED EPA METHOD TO-15 GC/MS SIM

**Client Sample ID: 104AG114AA**

**Lab ID#: 1005429A-01A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.027	0.044	0.18	0.30

**Client Sample ID: 104AG115AA**

**Lab ID#: 1005429A-02A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.026	0.054	0.18	0.37

**Client Sample ID: 104AG115AA Lab Duplicate**

**Lab ID#: 1005429A-02AA**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.026	0.055	0.18	0.37

**Client Sample ID: 104AG116IA**

**Lab ID#: 1005429A-03A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.073	3.7	0.50	25

**Client Sample ID: 104AG117IA**

**Lab ID#: 1005429A-04A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.027	0.98	0.18	6.6

**Client Sample ID: 104AG118IA**

**Lab ID#: 1005429A-05A**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.031	1.1	0.21	7.2

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**Summary of Detected Compounds**  
**MODIFIED EPA METHOD TO-15 GC/MS SIM**

**Client Sample ID: 104AG119CS**

**Lab ID#: 1005429A-06A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Tetrachloroethene	0.11	16	0.76	110

**Client Sample ID: 104AG120CS**

**Lab ID#: 1005429A-07A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Tetrachloroethene	0.27	2.4	1.8	16

**Client Sample ID: 104AG125TB**

**Lab ID#: 1005429A-12A**

No Detections Were Found.

Client Sample ID: 104AG114AA

Lab ID#: 1005429A-01A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052406	Date of Collection: 5/13/10 9:45:00 AM
Dil. Factor:	1.37	Date of Analysis: 5/24/10 10:40 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.014	Not Detected	0.035	Not Detected
cis-1,2-Dichloroethene	0.027	Not Detected	0.11	Not Detected
Trichloroethene	0.027	Not Detected	0.15	Not Detected
Tetrachloroethene	0.027	0.044	0.18	0.30
trans-1,2-Dichloroethene	0.14	Not Detected	0.54	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	87	70-130

Client Sample ID: 104AG115AA

Lab ID#: 1005429A-02A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052407	Date of Collection: 5/13/10 9:50:00 AM
Dil. Factor:	1.29	Date of Analysis: 5/24/10 11:31 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.013	Not Detected	0.033	Not Detected
cis-1,2-Dichloroethene	0.026	Not Detected	0.10	Not Detected
Trichloroethene	0.026	Not Detected	0.14	Not Detected
Tetrachloroethene	0.026	0.054	0.18	0.37
trans-1,2-Dichloroethene	0.13	Not Detected	0.51	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130



Client Sample ID: 104AG115AA Lab Duplicate

Lab ID#: 1005429A-02AA

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052408	Date of Collection: 5/13/10 9:50:00 AM
Dil. Factor:	1.29	Date of Analysis: 5/24/10 12:16 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.013	Not Detected	0.033	Not Detected
cis-1,2-Dichloroethene	0.026	Not Detected	0.10	Not Detected
Trichloroethene	0.026	Not Detected	0.14	Not Detected
Tetrachloroethene	0.026	0.055	0.18	0.37
trans-1,2-Dichloroethene	0.13	Not Detected	0.51	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	95	70-130

Client Sample ID: 104AG116IA

Lab ID#: 1005429A-03A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052409	Date of Collection: 5/13/10 10:00:00 AM
Dil. Factor:	3.65	Date of Analysis: 5/24/10 01:06 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.036	Not Detected	0.093	Not Detected
cis-1,2-Dichloroethene	0.073	Not Detected	0.29	Not Detected
Trichloroethene	0.073	Not Detected	0.39	Not Detected
Tetrachloroethene	0.073	3.7	0.50	25
trans-1,2-Dichloroethene	0.36	Not Detected	1.4	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: 104AG117IA

Lab ID#: 1005429A-04A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>c052410</b>	<b>Date of Collection:</b> 5/13/10 10:05:00 AM
<b>Dil. Factor:</b>	<b>1.34</b>	<b>Date of Analysis:</b> 5/24/10 02:04 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.013	Not Detected	0.034	Not Detected
cis-1,2-Dichloroethene	0.027	Not Detected	0.11	Not Detected
Trichloroethene	0.027	Not Detected	0.14	Not Detected
Tetrachloroethene	0.027	0.98	0.18	6.6
trans-1,2-Dichloroethene	0.13	Not Detected	0.53	Not Detected

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: 104AG118IA

Lab ID#: 1005429A-05A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052411	Date of Collection: 5/13/10 10:10:00 AM
Dil. Factor:	1.53	Date of Analysis: 5/24/10 02:38 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
cis-1,2-Dichloroethene	0.031	Not Detected	0.12	Not Detected
Trichloroethene	0.031	Not Detected	0.16	Not Detected
Tetrachloroethene	0.031	1.1	0.21	7.2
trans-1,2-Dichloroethene	0.15	Not Detected	0.61	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: 104AG119CS

Lab ID#: 1005429A-06A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052413	Date of Collection: 5/13/10 10:20:00 AM
Dil. Factor:	5.62	Date of Analysis: 5/24/10 03:13 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.056	Not Detected	0.14	Not Detected
cis-1,2-Dichloroethene	0.11	Not Detected	0.44	Not Detected
Trichloroethene	0.11	Not Detected	0.60	Not Detected
Tetrachloroethene	0.11	16	0.76	110
trans-1,2-Dichloroethene	0.56	Not Detected	2.2	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: 104AG120CS

Lab ID#: 1005429A-07A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052414	Date of Collection: 5/13/10 10:25:00 AM
Dil. Factor:	13.4	Date of Analysis: 5/24/10 03:47 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.13	Not Detected	0.34	Not Detected
cis-1,2-Dichloroethene	0.27	Not Detected	1.1	Not Detected
Trichloroethene	0.27	Not Detected	1.4	Not Detected
Tetrachloroethene	0.27	2.4	1.8	16
trans-1,2-Dichloroethene	1.3	Not Detected	5.3	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: 104AG125TB

Lab ID#: 1005429A-12A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052415	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 5/24/10 04:31 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	89	70-130

Client Sample ID: Lab Blank

Lab ID#: 1005429A-13A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	c052405	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 5/24/10 09:53 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	94	70-130



Client Sample ID: CCV

Lab ID#: 1005429A-14A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>c052402</b>	<b>Date of Collection:</b> NA
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 5/24/10 07:45 AM

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	102
cis-1,2-Dichloroethene	101
Trichloroethene	99
Tetrachloroethene	98
trans-1,2-Dichloroethene	104

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: LCS

Lab ID#: 1005429A-15A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>c052403</b>	<b>Date of Collection:</b> NA
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 5/24/10 08:45 AM

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	106
cis-1,2-Dichloroethene	100
Trichloroethene	100
Tetrachloroethene	96
trans-1,2-Dichloroethene	105

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	104	70-130



# CHAIN-OF-CUSTODY RECORD

## Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

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FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 1 of 2

Project Manager

Ben Metrich

Collected by: (Print and Sign)

Zek Kirk + Ashley Hansen

Company 04515 Environmental

Email ben@airtoxics.com

Address 325 W 8th

City Anchorage State AK Zip 99501

Phone 907-264-4469

Fax \_\_\_\_\_

## Project Info:

P.O. # \_\_\_\_\_

Project # 14-174

Project Name 4th + 6th St

Turn Around Time:

☒ Normal

☐ Rush

Lab Use Only Pressurized by:

Date:

Pressurization Gas:

specify N<sub>2</sub> He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum		
						Initial	Final	Receipt (psi)
01A	104AG114AA	34181	5/13/10	0645	To-15 (short shot)	28.5	0	
02A	104AG115AA	34748	5/13/10	0650		24.5	0	
03A	104AG116TA	35367	5/13/10	1000		28	18.5	
04A	104AG117TA	11879	5/13/10	1005		27.5	0	
05A	104AG118TA	33888	5/13/10	1010		29	3	
06A	104AG119CS	34011	5/13/10	1020		29	2	
07A	104AG120CS	10661	5/13/10	1025		29	4.5	
	104AG121SG	12808	5/13/10	1220	To-15 (short shot)	30	8	
	104AG122SG	36480	5/13/10	1340		30	12	
	104AG123SG	36405	5/13/10	1415		30	8	

Relinquished by: (signature) Ben Metrich Date/Time 5/17/10 1100

Received by: (signature) Monica Hansen Date/Time 5/18/10 0900

Relinquished by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Received by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Relinquished by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Received by: (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_

Shipper Name Fed Ex Air Bill # NA Temp (°C) 60 Condition Good Custody Seals Intact? Yes No None Work Order # 1005429



## Sample Transportation Notice

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FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020**

Page 7 of 2

## Project info:

P.O.#

Figure 1. Schematic representation of the experimental design. The subjects were divided into two groups: the control group (CG) and the experimental group (EG). The CG was divided into two subgroups: the control group (CG) and the control group (CG). The EG was divided into two subgroups: the experimental group (EG) and the experimental group (EG). The CG was divided into two subgroups: the control group (CG) and the control group (CG). The EG was divided into two subgroups: the experimental group (EG) and the experimental group (EG).

Project # 11-111

Fax

Project Name.

**Turn Around Time:**

☒ Normal

☐ Rush

*Specify*

Lab Use Only  
Pressurized by:

Date:

Pressurization Gas:

[illegible]

Received by: (signature)

Date/Time

**Notes:**

Received by: (signature)

Date/Time

⑤

Received by: (signature)

Date/Time

Air Bill #

Temp (°C)

Condition

## Custody Seals Intact?

Work Order #

22

127

5

<p>    National Bureau of Economic Research   100 Brook Avenue   Cambridge, MA 02138   Tel: 617 852 6100   Fax: 617 852 6190   E-mail: <a href="mailto:info@nber.org">info@nber.org</a>   Web: <a href="http://www.nber.org">http://www.nber.org</a> </p>	<p>    European Central Bank   Kaiserstrasse 29   60325 Frankfurt am Main   Germany   Tel: +49 69 2124-3000   Fax: +49 69 2124-3190   E-mail: <a href="mailto:info@ecb.int">info@ecb.int</a>   Web: <a href="http://www.ecb.int">http://www.ecb.int</a> </p>
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5

[illegible]

# REPORT

6/1/2010

Mr. Ben Martich

Oasis Environmental, Inc.

825 W. 8th Avenue

Suite 200

Anchorage AK 99501

Project Name: 4th + Gambell

Project #: 14-174

Workorder #: 1005429B

Dear Mr. Ben Martich

The following report includes the data for the above referenced project for sample(s) received on 5/18/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Lopez at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Lopez

Project Manager

**WORK ORDER #: 1005429B**

Work Order Summary

<b>CLIENT:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501	<b>BILL TO:</b>	Mr. Ben Martich Oasis Environmental, Inc. 825 W. 8th Avenue Suite 200 Anchorage, AK 99501
<b>PHONE:</b>	907-258-4880	<b>P.O. #</b>	
<b>FAX:</b>		<b>PROJECT #</b>	14-174 4th + Gambell
<b>DATE RECEIVED:</b>	05/18/2010	<b>CONTACT:</b>	Karen Lopez
<b>DATE COMPLETED:</b>	06/01/2010		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
08A	104AG121SG	Modified TO-15	0.5 "Hg	15 psi
09A	104AG122SG	Modified TO-15	10.5 "Hg	15 psi
10A	104AG123SG	Modified TO-15	6.5 "Hg	15 psi
11A	104AG124SG	Modified TO-15	5.5 "Hg	15 psi
12A	Lab Blank	Modified TO-15	NA	NA
13A	CCV	Modified TO-15	NA	NA
14A	LCS	Modified TO-15	NA	NA

CERTIFIED BY:



Laboratory Director

DATE: 06/01/10

Certification numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,  
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719

Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,  
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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**LABORATORY NARRATIVE**  
**Modified TO-15**  
**Oasis Environmental, Inc.**  
**Workorder# 1005429B**

Four 1 Liter Summa Canister samples were received on May 18, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
Daily CCV	<= 30% Difference	<= 30% Difference; Compounds exceeding this criterion and associated data are flagged and narrated.
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

**Receiving Notes**

There was a significant difference (greater than 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for sample 104AG121SG. A leak test indicated that the valve was functioning properly.

**Analytical Notes**

There were no analytical discrepancies.

**Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



## Summary of Detected Compounds

### MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

**Client Sample ID: 104AG121SG**

**Lab ID#: 1005429B-08A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Tetrachloroethene	1.0	38	7.0	260

**Client Sample ID: 104AG122SG**

**Lab ID#: 1005429B-09A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Tetrachloroethene	5.2	1500	35	10000

**Client Sample ID: 104AG123SG**

**Lab ID#: 1005429B-10A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Tetrachloroethene	1.3	33	8.8	230

**Client Sample ID: 104AG124SG**

**Lab ID#: 1005429B-11A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Tetrachloroethene	1.2	92	8.4	630

Client Sample ID: 104AG121SG

Lab ID#: 1005429B-08A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>x052523</b>	<b>Date of Collection:</b> 5/13/10 12:20:00 PM
<b>Dil. Factor:</b>	<b>2.05</b>	<b>Date of Analysis:</b> 5/26/10 12:11 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
Tetrachloroethene	1.0	38	7.0	260
Trichloroethene	1.0	Not Detected	5.5	Not Detected
1,2-Dichloroethene (Total of cis/trans)	1.0	Not Detected	4.1	Not Detected

**Container Type: 1 Liter Summa Canister**

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	114	70-130

Client Sample ID: 104AG122SG

Lab ID#: 1005429B-09A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>x052524</b>	<b>Date of Collection:</b> 5/13/10 1:40:00 PM
<b>Dil. Factor:</b>	<b>10.4</b>	<b>Date of Analysis:</b> 5/26/10 12:48 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	5.2	Not Detected	13	Not Detected
Tetrachloroethene	5.2	1500	35	10000
Trichloroethene	5.2	Not Detected	28	Not Detected
1,2-Dichloroethene (Total of cis/trans)	5.2	Not Detected	21	Not Detected

**Container Type: 1 Liter Summa Canister**

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	110	70-130

Client Sample ID: 104AG123SG

Lab ID#: 1005429B-10A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>x052525</b>	<b>Date of Collection:</b> 5/13/10 2:15:00 PM
<b>Dil. Factor:</b>	<b>2.58</b>	<b>Date of Analysis:</b> 5/26/10 01:40 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	1.3	Not Detected	3.3	Not Detected
Tetrachloroethene	1.3	33	8.8	230
Trichloroethene	1.3	Not Detected	6.9	Not Detected
1,2-Dichloroethene (Total of cis/trans)	1.3	Not Detected	5.1	Not Detected

**Container Type: 1 Liter Summa Canister**

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	113	70-130

Client Sample ID: 104AG124SG

Lab ID#: 1005429B-11A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>x052526</b>	<b>Date of Collection:</b> 5/13/10 2:45:00 PM
<b>Dil. Factor:</b>	<b>2.47</b>	<b>Date of Analysis:</b> 5/26/10 02:20 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	1.2	Not Detected	3.2	Not Detected
Tetrachloroethene	1.2	92	8.4	630
Trichloroethene	1.2	Not Detected	6.6	Not Detected
1,2-Dichloroethene (Total of cis/trans)	1.2	Not Detected	4.9	Not Detected

**Container Type: 1 Liter Summa Canister**

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	113	70-130

Client Sample ID: Lab Blank

Lab ID#: 1005429B-12A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>x052510</b>	<b>Date of Collection:</b> NA
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 5/25/10 01:08 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloroethene (Total of cis/trans)	0.50	Not Detected	2.0	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	111	70-130

Client Sample ID: CCV

Lab ID#: 1005429B-13A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>x052507</b>	<b>Date of Collection:</b> NA
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 5/25/10 10:43 AM

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	92
Tetrachloroethene	100
Trichloroethene	98
1,2-Dichloroethene (Total of cis/trans)	95

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	124	70-130

Client Sample ID: LCS

Lab ID#: 1005429B-14A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>x052508</b>	<b>Date of Collection:</b> NA
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 5/25/10 11:31 AM

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	93
Tetrachloroethene	103
Trichloroethene	100
1,2-Dichloroethene (Total of cis/trans)	98

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	125	70-130





# CHAIN-OF-CUSTODY RECORD

## Sample Transportation Notice

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(916) 985-1000 FAX (916) 985-1020

Page 1 of 2

Project Manager

Ben Metrich

Collected by: (Print and Sign)

Ben Metrich + Ashley Hansen

Company

0813 Environmental Email [ben@airtoxics.com](mailto:ben@airtoxics.com)

Address

825 W 8th City Anchorage State AK Zip 99501

Phone 907-264-4469

Fax

## Project Info:

P.O. #

14-174

Project #

4th + Garfield

Project Name

4th + Garfield

Turn Around Time:

☒ Normal

☐ Rush

Lab Use Only

Pressurized by:

Date:

Pressurization Gas:

N<sub>2</sub> He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum			
						Initial	Final	Receipt (psf)	
	104AG114AA	34181	5/13/10	0945	To-15 SIM (collected 1st)	28.5	0		
	104AG115AA	34748	5/13/10	0950		24.5	0		
	104AG116IA	35367	5/13/10	1000		28	18.5		
	104AG117IA	11879	5/13/10	1005		27.5	0		
	104AG118IA	33888	5/13/10	1010		29	3		
	104AG119CS	34011	5/13/10	1020		29	2		
	104AG120CS	10661	5/13/10	1025		29	4.5		
	08A	104AG121SC	12808	5/13/10	1220	To-15 (collected 1st)	30	8	
	09A	104AG122SC	36480	5/13/10	1340		30	12	
	10A	104AG123SC	36405	5/13/10	1415		30	8	

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Notes: PCE, TCE, OCE, TDE, VC

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Lab Shipper Name Air Bill # Temp (°C) Condition Custody Seals Intact? Work Order #

Use Only



# CHAIN-OF-CUSTODY RECORD

## Sample Transportation Notice

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FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 2 of 2

Project Manager

Ben Muthich

Collected by: (Print and Sign)

Zack Kirk + Ashley Hansen

Company OASIS Environmental

Email bmuthich@oasisenviro.com

Address 835 W 85

City Anchorage State AK Zip 99501

Phone 907-264-4469

Fax

### Project Info:

P.O. #

Project # 14-174

Project Name 4th + Gravel

### Turn Around Time:

Time:

☒ Normal

☐ Rush

Lab Use Only

Pressurized by:

Date:

Pressurization Gas:

specify

N<sub>2</sub> He

Lab I.D. Field Sample I.D. (Location)

Can #

Date

Time

Analyses Requested

Canister Pressure/Vacuum

Initial Final Receipt Final (ps)

11A

104AG1245G

13389

5/13/10

1445

To-15 (colant shut list)

30

6

104AG125TB

9559

—

—

To-15 SIM (colant shut list)

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Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Notes:

Ben Muthich 5/17/10 11:00

Ben Muthich 5/18/10 9:00

PCE, TCE, COC, + DCE, VC

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Lab Shipper Name

Air Bill #

Temp (°C)

Condition

Custody Seals Intact?

Work Order #

Lab Use Only

Red by

NA

Good

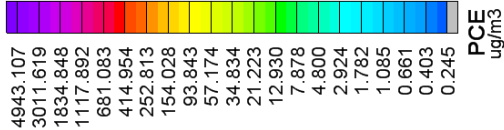
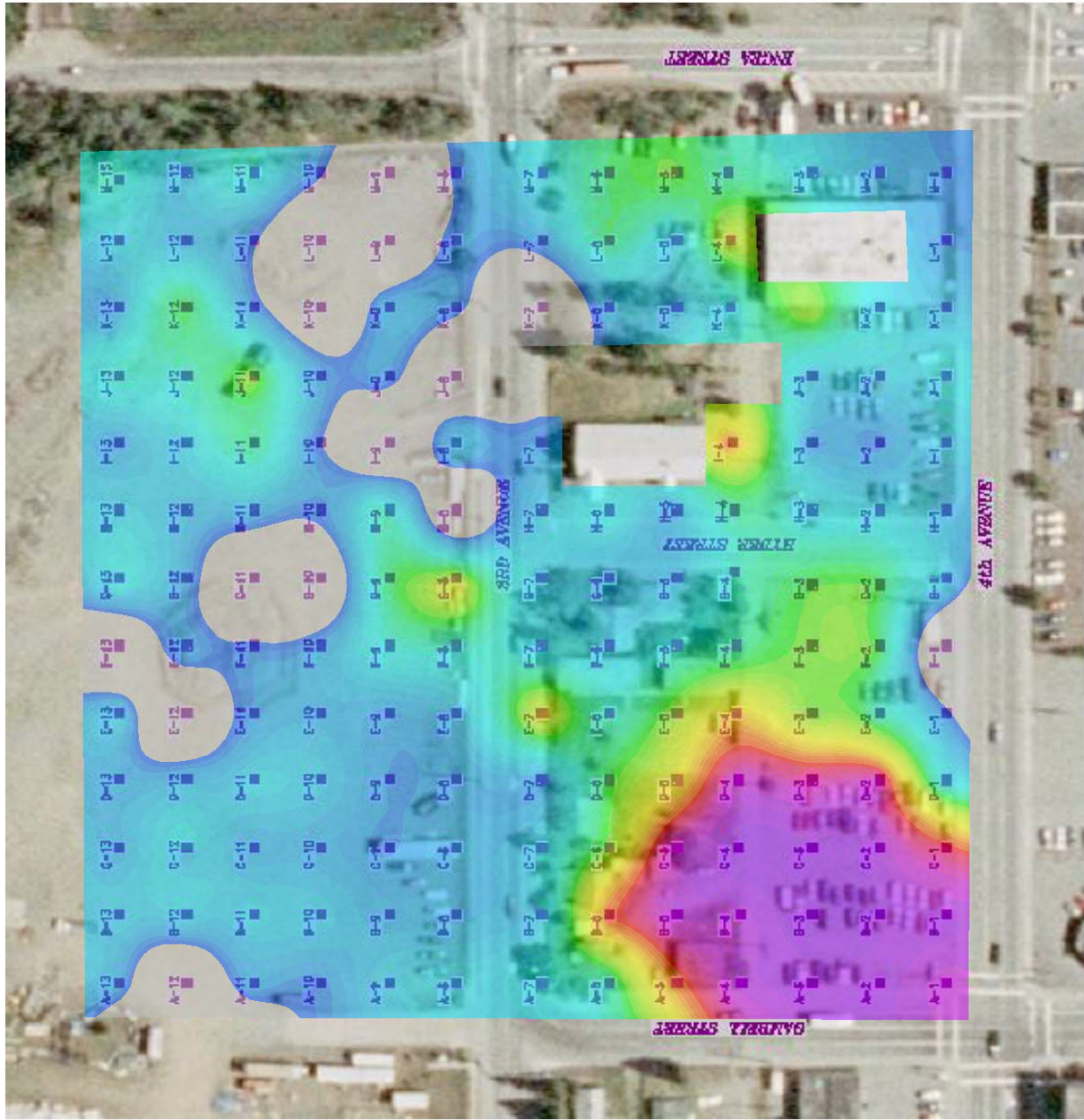
Yes No None

1005428

## **APPENDIX D**

### **Passive Soil Gas Sampling Results**

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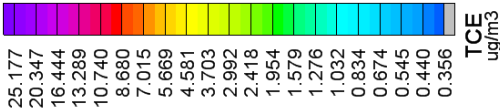
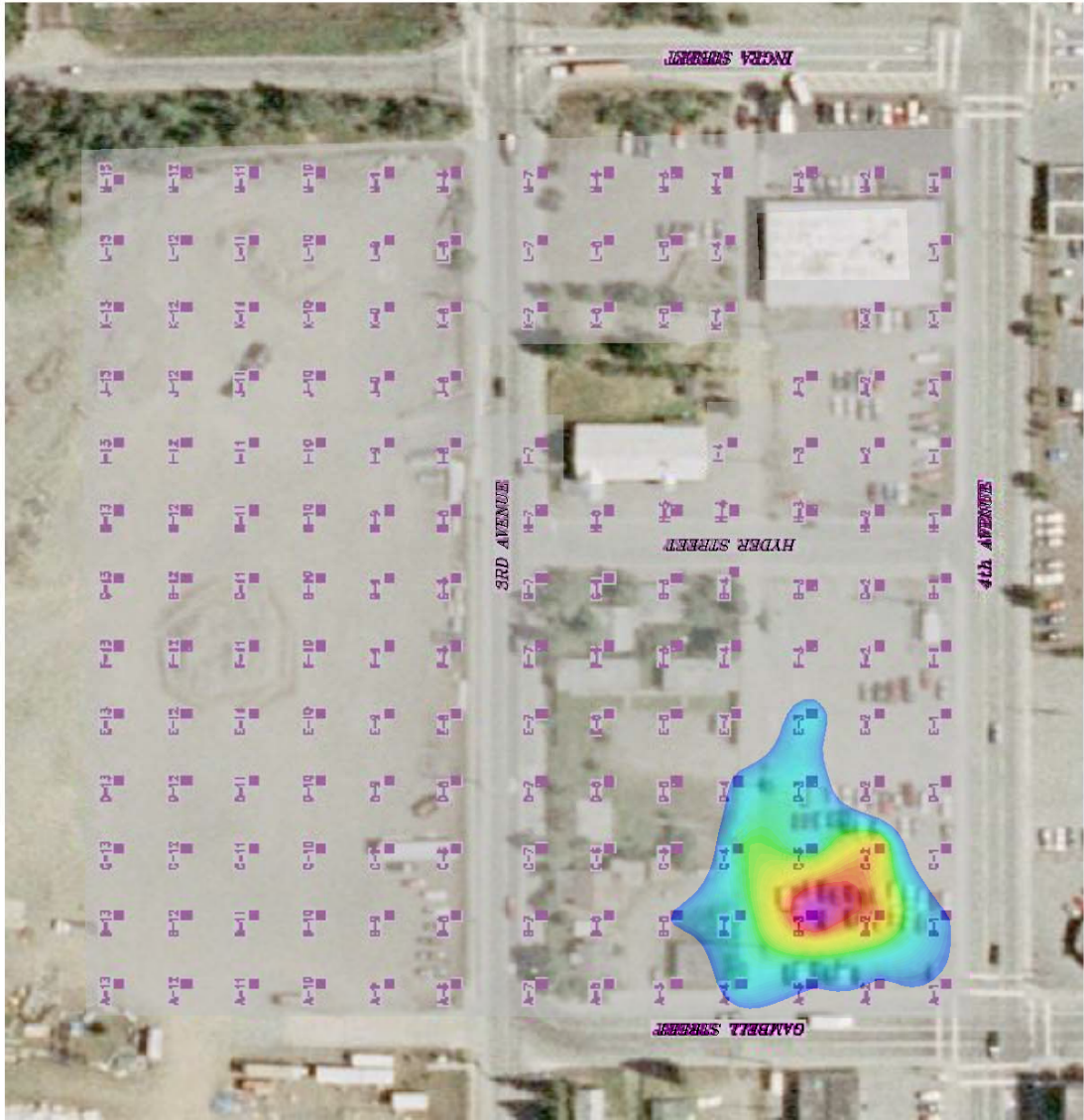
Oasis Environmental, Anchorage, AK  
4th & Gambell  
Tetrachloroethene  
Estimated Soil Gas Concentrations



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DATE DRAWN: 22 June 2010	JW	ORIG. CAD: FOURTH.DWG	SITE CODE: FJ1
REV. DATE:	REV. #:	PROJECT NUMBER: 2049055	





GORE™ Surveys for Environmental Site Assessment

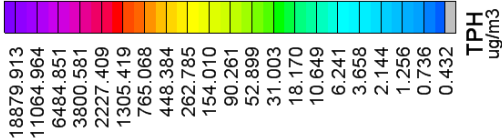
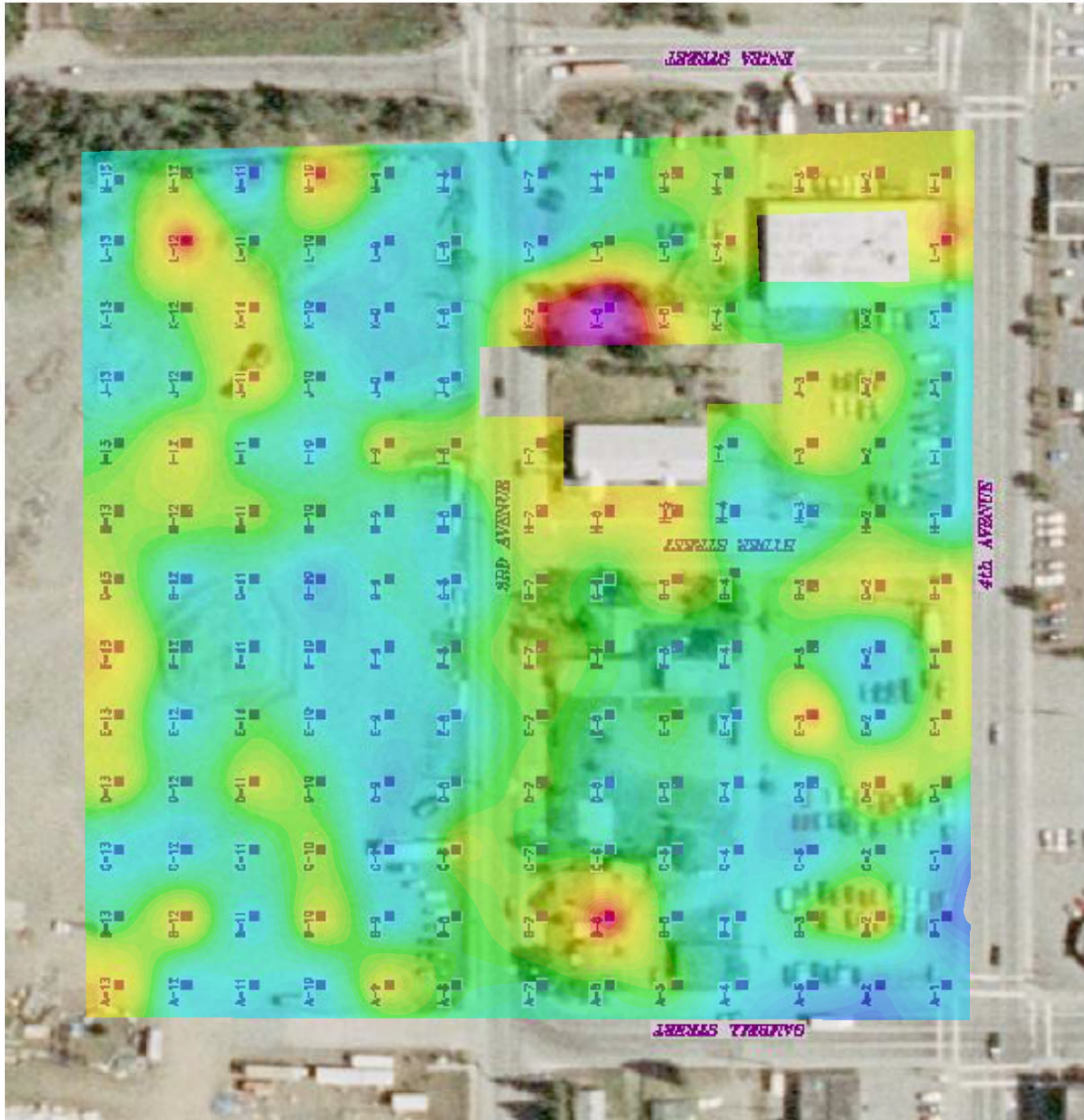


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USA  
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Oasis Environmental, Anchorage, AK  
4th & Gambell  
Trichloroethene  
Estimated Soil Gas Concentrations

DATE DRAWN: 22 June 2010	DRAWN BY: JW	ORIG. CAD: FOURTH.DWG	SITE CODE: FJ
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Oasis Environmental, Anchorage, AK  
4th & Gambell  
Total Petroleum Hydrocarbons  
Estimated Soil Gas Concentrations

DATE DRAWN: 22 June 2010	DRAWN BY: JW	ORIG. CAD: FOURTH.DWG	SITE CODE: FJ
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OASIS ENVIRONMENTAL, INC., ANCHORAGE AK  
GORE CHLORINATED HYDROCARBONS (A10)  
4TH AND GAMBELL ANCHORAGE, AK  
SITE FUJ - PRODUCTION ORDER #20450055

DATE ANALYZED	FIELD ID	SAMPLE NAME	TPH, ug	CIBENZ, ug	α112DCE, ug	11DCA, ug	CHCl3, ug	111TCA, ug	12DCA, ug	TCE, ug	PCE, ug	14DCB, ug	CCl4, ug	112TCA, ug	1112TetCA, ug	1122TetCA, ug	13DCB, ug	12DCB, ug
5/25/10	C2	MDL=	0.02	nd	0.03	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.02	0.02	0.02
5/25/10	C2	623178	1.33	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	A2	623179	0.07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	E5-1	623180	1.23	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	E7	623181	3.62	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	A6	623182	2.06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	A1	623183	0.21	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	D2	623184	21.06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	A3	623185	0.16	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	E6	623186	1.60	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	F7	623187	8.24	nd	nd	nd	0.10	nd	nd	nd	nd	0.30	nd	nd	nd	nd	nd	nd
5/29/10	A5	623188	3.21	nd	nd	nd	nd	nd	nd	nd	nd	20.66	nd	nd	nd	nd	nd	nd
5/24/10	B1	623189	0.06	nd	nd	nd	nd	nd	nd	0.03	289.11	nd	nd	nd	nd	nd	nd	nd
5/28/10	E2	623190	0.32	nd	nd	nd	nd	nd	nd	nd	0.43	nd	nd	nd	nd	nd	nd	nd
5/29/10	B3	623191	4.66	nd	0.04	nd	nd	nd	nd	1.47	402.61	0.09	nd	0.08	0.86	nd	bdl	0.53
5/29/10	E5	623192	2.95	nd	nd	nd	nd	nd	nd	nd	1.80	nd	nd	nd	nd	nd	nd	nd
5/25/10	D7	623193	4.46	nd	nd	nd	nd	nd	nd	nd	0.03	0.03	nd	nd	nd	nd	nd	nd
5/29/10	A7	623843	1.48	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	nd	nd	nd	nd	nd
5/25/10	C1	623844	0.10	nd	nd	nd	nd	nd	nd	nd	52.91	nd	nd	nd	nd	nd	nd	nd
5/28/10	F2	623845	0.17	nd	nd	nd	nd	nd	nd	nd	1.14	nd	nd	nd	nd	nd	nd	nd
5/27/10	C3	623846	0.23	nd	nd	nd	nd	nd	nd	0.05	340.94	nd	nd	nd	bdl	nd	nd	nd
5/25/10	F6	623847	2.31	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	nd	nd	nd	nd	nd
5/27/10	D6	623848	0.58	nd	nd	nd	nd	nd	nd	nd	0.84	nd	nd	nd	nd	nd	nd	nd
5/26/10	B7	623849	9.53	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	nd	nd	nd	nd	nd
5/27/10	G3	623851	8.44	nd	nd	nd	nd	nd	nd	nd	1.07	nd	nd	nd	nd	nd	nd	nd
5/28/10	C3-1	623852	0.14	nd	nd	nd	nd	nd	nd	0.06	347.56	nd	nd	nd	bdl	nd	nd	nd
5/29/10	F5	623853	0.81	nd	nd	nd	nd	nd	nd	nd	0.27	nd	nd	nd	nd	nd	nd	nd
5/27/10	D5	623854	1.45	nd	nd	nd	nd	nd	nd	nd	5.86	nd	nd	nd	nd	nd	nd	nd
5/26/10	B6	623855	353.33	nd	nd	nd	nd	nd	nd	nd	32.98	nd	nd	nd	nd	nd	nd	nd
5/25/10	D1	623856	3.83	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	nd	nd	nd	nd	nd
5/28/10	G2	623857	29.13	nd	nd	nd	nd	nd	nd	nd	1.04	bdl	nd	nd	nd	nd	nd	0.02
5/25/10	D3	623858	0.39	nd	nd	nd	nd	nd	nd	0.06	97.31	nd	nd	nd	nd	nd	nd	nd
5/29/10	G7	623859	4.47	nd	nd	nd	nd	0.04	0.04	0.43	342.83	0.08	nd	nd	0.04	nd	nd	bdl
5/25/10	B2	623860	23.28	nd	nd	nd	nd	nd	nd	0.03	175.44	bdl	nd	nd	nd	nd	nd	nd
5/25/10	B5-1	623861	1.97	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/26/10	E1	623862	10.21	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/25/10	G1-1	623863	20.03	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	nd	nd	nd	nd	nd
5/25/10	G6	623865	1.57	nd	nd	nd	nd	nd	nd	nd	0.06	nd	nd	nd	nd	nd	nd	nd
5/25/10	C5	623866	1.29	nd	nd	nd	nd	nd	nd	nd	148.97	nd	nd	nd	nd	nd	nd	nd
5/28/10	B5	623867	0.34	nd	nd	nd	nd	nd	nd	0.03	236.54	nd	nd	nd	nd	nd	nd	nd
5/24/10	F1	623868	9.66	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	nd	nd	nd	nd	nd
5/25/10	G1	623869	18.11	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	nd	nd	nd	nd	nd
5/28/10	E3	623870	100.78	nd	nd	nd	nd	nd	nd	nd	1.29	nd	nd	nd	nd	nd	nd	nd
5/27/10	G5	623871	18.00	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd	nd	nd	nd	nd	nd
5/28/10	C6	623872	1.17	nd	nd	nd	nd	nd	nd	nd	1.13	nd	nd	nd	nd	nd	nd	nd
5/26/10	C7	623873	1.95	nd	nd	nd	nd	nd	nd	nd	0.12	bdl	nd	nd	nd	nd	nd	nd
5/25/10	H3	623874	0.45	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	nd	nd	nd	nd	nd
5/28/10	M3	623875	18.11	nd	nd	nd	nd	nd	nd	nd	0.16	nd	0.05	nd	nd	nd	nd	nd
5/25/10	M3-1	623876	35.79	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	nd	nd	nd	nd	nd
5/26/10	A8	623877	1.96	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	nd	nd	nd	nd	nd
5/27/10	A9	623878	14.85	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd	nd	nd	nd	nd	nd
5/26/10	C11	623879	0.90	nd	nd	nd	nd	nd	nd	nd	0.04	nd	nd	nd	nd	nd	nd	nd
5/25/10	M2	623881	20.52	nd	nd	nd	nd	nd	nd	nd	0.05	nd	nd	nd	nd	nd	nd	nd
5/24/10	M5	623882	9.00	nd	nd	nd	nd	nd	nd	nd	1.23	nd	nd	nd	nd	nd	nd	nd
5/27/10	I7	623883	16.37	nd	nd	nd	nd	nd	nd	nd	0.04	nd	nd	nd	nd	nd	nd	nd
5/27/10	A10	623884	0.33	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/26/10	C10	623885	5.97	nd	nd	nd	nd	nd	nd	nd	0.04	nd	nd	nd	nd	nd	nd	nd
5/27/10	H1	623886	0.35	nd	nd	nd	nd	nd	nd	nd	0.06	nd	nd	nd	nd	nd	nd	nd
5/28/10	M1	623887	13.28	nd	nd	nd	nd	nd	nd	nd	0.03	0.03	0.06	nd	nd	nd	nd	nd
5/24/10	M6	623888	0.49	nd	nd	nd	nd	nd	nd	nd	0.69	nd	nd	nd	nd	nd	nd	nd
5/26/10	H7	623889	27.13	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd	nd	nd	nd	nd	nd
5/26/10	A11	623890	0.53	nd	nd	nd	nd	nd	nd	nd	0.04	nd	nd	nd	nd	nd	nd	nd
5/28/10	C9	623891	0.12	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd

No ndt is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.



GORE(TM) SURVEYS ANALYTICAL RESULTS  
 OASIS ENVIRONMENTAL, INC., ANCHORAGE AK  
 GORE CHLORINATED HYDROCARBONS (A10)  
 4TH AND GAMBELL ANCHORAGE, AK  
 SITE FUJ - PRODUCTION ORDER #20496055

DATE ANALYZED	FIELD ID	SAMPLE NAME	TPH, ug	CIBENZ, ug	ci12DCE, ug	11DCA, ug	CHCl3, ug	111TCA, ug	12DCA, ug	TCE, ug	PCE, ug	14DCB, ug	CCl4, ug	112TCA, ug	1112TetCA, ug	1122TetCA, ug	13DCB, ug	12DCB, ug
5/29/10	I1	623892	0.54	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	L1	623893	106.86	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	M7	623894	0.33	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	H6	623895	46.70	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	A12	623896	0.30	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	C8	623897	7.61	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	J1	623898	0.40	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	K2	623899	2.38	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	L5	623900	1.18	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	H5-1	623901	54.45	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	A13	623902	39.93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	B8	623903	2.05	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	J1-1	623904	2.58	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	J3	623905	15.50	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	L6	623906	2.24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	H5	623907	42.29	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	B13	623908	1.71	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	B9	623909	0.32	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	K1	623910	0.32	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	J2	623911	10.51	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	L7	623912	0.11	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	K5	623913	15.87	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	B13-1	623914	1.07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	B10	623915	19.59	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	I2	623916	2.37	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	I3	623917	27.34	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	K6	623918	1885.48	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	K7	623919	160.34	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	B12	623920	26.21	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	B11	623921	0.27	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	D9	623922	0.13	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	D8	623923	0.95	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	G8-1	623924	0.68	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	H11	623925	5.54	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	J8	623926	0.30	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	J11	623927	22.24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	D10	623928	2.13	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	E8	623929	0.34	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	G8	623930	0.26	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	H12	623931	5.96	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	J9	623932	0.19	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	J12	623933	0.97	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	D11	623934	9.43	nd	nd	0.05	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	E9	623935	0.33	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	F8	623936	1.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	I9	623938	11.62	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	J13-1	623939	0.28	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	D12	623940	1.22	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	E10	623941	0.55	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	F9	623942	0.32	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	G13	623943	6.12	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	I8	623944	5.95	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	J13	623945	0.55	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	D13	623946	12.69	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	E10-1	623947	0.24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	F10	623948	0.33	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	G12	623949	0.33	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	H8	623950	0.50	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	I13	623951	2.22	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	C13	623952	0.33	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	E11	623953	2.46	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	F11	623954	0.64	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

No ndt is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

GORE(TM) SURVEYS ANALYTICAL RESULTS  
 OASIS ENVIRONMENTAL, INC., ANCHORAGE AK  
 GORE CHLORINATED HYDROCARBONS (A10)  
 4TH AND GAMBELL ANCHORAGE, AK  
 SITE FUJ - PRODUCTION ORDER #20450055

DATE ANALYZED	FIELD ID	SAMPLE NAME	TPH, ug	CIBENZ, ug	cr12DCE, ug	11DCA, ug	CHCl3, ug	111TCA, ug	12DCA, ug	TCE, ug	PCE, ug	14DCB, ug	CCl4, ug	112TCA, ug	1112TetCA, ug	1122TetCA, ug	13DCB, ug	12DCB, ug
5/28/10	G11	MDL=	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.02	0.02	0.02
5/28/10	H9-1	623955	0.66	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	H9-1	623956	0.67	nd	nd	nd	nd	nd	nd	nd	0.67	nd	nd	nd	nd	nd	nd	nd
5/25/10	I12	623957	16.06	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd	nd	nd	nd	nd	nd
5/25/10	C12-1	623958	0.18	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	nd	nd	nd	nd	nd
5/27/10	E12	623959	0.32	nd	nd	nd	nd	nd	nd	nd	0.05	nd	nd	nd	nd	nd	nd	nd
5/29/10	F12	623960	1.17	nd	nd	nd	nd	nd	nd	nd	0.05	nd	nd	nd	nd	nd	nd	nd
5/28/10	G10	623961	0.09	nd	nd	nd	nd	nd	nd	nd	0.61	nd	nd	nd	nd	nd	nd	nd
5/26/10	H9-1	623962	0.72	nd	nd	nd	nd	nd	nd	nd	0.59	nd	nd	nd	nd	nd	nd	nd
5/29/10	I11	623963	0.75	nd	nd	nd	nd	nd	nd	nd	0.05	nd	nd	nd	nd	nd	nd	nd
5/24/10	C12-1	623968	0.39	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	nd	nd	nd	nd	nd
5/28/10	E13	623969	11.37	nd	nd	nd	nd	0.05	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/26/10	F13	623970	33.31	nd	nd	nd	nd	nd	nd	nd	0.69	nd	nd	nd	nd	nd	nd	nd
5/27/10	G9	623971	1.35	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/26/10	H10	623972	2.28	nd	nd	nd	nd	nd	nd	nd	0.02	nd	nd	nd	nd	nd	nd	nd
5/24/10	I10	623973	0.33	nd	nd	nd	nd	nd	nd	nd	0.02	nd	nd	nd	nd	nd	nd	nd
5/27/10	L13	623974	1.32	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	nd	nd	nd	nd	nd
5/27/10	L13-1	623975	0.24	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	nd	nd	nd	nd	nd
5/26/10	D4	623976	0.51	nd	nd	nd	nd	nd	nd	0.03	163.88	nd	nd	nd	0.05	nd	nd	nd
5/26/10	E4	623977	0.38	nd	nd	nd	nd	nd	nd	0.03	13.20	nd	nd	nd	nd	nd	nd	nd
5/28/10	M4	623978	3.06	nd	nd	nd	nd	nd	nd	nd	0.39	nd	nd	nd	nd	nd	nd	nd
5/26/10	K13	623980	1.17	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/27/10	L12	623981	206.94	nd	nd	nd	nd	nd	nd	nd	0.05	nd	nd	nd	0.12	nd	nd	nd
5/28/10	C4	623982	0.30	nd	nd	nd	nd	nd	nd	0.09	371.97	nd	nd	nd	nd	nd	nd	nd
5/27/10	F4	623983	1.05	nd	nd	nd	nd	nd	nd	nd	0.39	nd	nd	nd	nd	nd	nd	nd
5/28/10	L4	623984	16.59	nd	nd	nd	nd	nd	nd	nd	3.46	nd	0.04	nd	nd	nd	nd	nd
5/29/10	K12	623986	2.52	nd	nd	nd	nd	nd	nd	nd	1.23	nd	nd	nd	nd	nd	nd	nd
5/26/10	L11	623987	1.78	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/28/10	B4	623988	0.33	nd	nd	nd	nd	nd	nd	0.05	176.03	nd	nd	nd	nd	nd	nd	nd
5/26/10	G4	623989	1.98	nd	nd	nd	nd	nd	nd	nd	0.29	nd	nd	nd	nd	nd	nd	nd
5/26/10	K11	623992	25.38	nd	nd	nd	nd	nd	nd	nd	0.04	nd	nd	nd	nd	nd	nd	nd
5/27/10	L10	623993	1.79	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	A4	623994	0.27	nd	nd	nd	nd	nd	nd	0.05	216.63	nd	nd	nd	nd	nd	nd	nd
5/25/10	A4-1	623995	1.90	nd	nd	nd	nd	nd	nd	nd	0.26	nd	nd	nd	nd	nd	nd	nd
5/25/10	K10	623998	0.13	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	L9	623999	0.16	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10	M13	624000	0.66	nd	nd	nd	nd	nd	nd	nd	0.40	nd	nd	nd	nd	nd	nd	nd
5/25/10	H4	624001	0.22	nd	nd	nd	nd	nd	nd	nd	0.43	nd	nd	nd	nd	nd	nd	nd
5/27/10	K9	624004	0.31	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd	nd	nd	nd	nd	nd
5/25/10	L8	624005	0.92	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/26/10	M12	624006	3.90	nd	nd	nd	nd	nd	nd	nd	0.06	nd	nd	nd	nd	nd	nd	nd
5/25/10	I4	624007	0.97	nd	nd	nd	nd	nd	nd	nd	25.54	nd	nd	nd	nd	nd	nd	nd
5/26/10	K8	624010	0.44	nd	nd	nd	nd	nd	nd	nd	0.04	nd	nd	nd	nd	nd	nd	nd
5/26/10	M8	624011	0.29	nd	nd	nd	nd	nd	nd	nd	0.02	nd	nd	nd	nd	nd	nd	nd
5/27/10	M11	624012	0.07	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	nd	nd	nd	nd	nd
5/27/10	J4	624013	0.36	nd	nd	nd	nd	nd	nd	nd	2.13	nd	nd	nd	nd	nd	nd	nd
5/27/10	J10	624016	1.14	nd	nd	nd	nd	nd	0.05	nd	0.04	nd	nd	nd	nd	nd	nd	nd
5/24/10	M9	624017	1.25	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/26/10	M10	624018	106.67	nd	nd	nd	nd	nd	nd	nd	0.03	nd	nd	nd	nd	nd	nd	nd
5/25/10	K4	624019	1.94	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	nd	nd	nd	nd	nd
5/25/10			nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10		623990	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10		623996	0.02	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/29/10		624002	0.03	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10		624008	0.03	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10		method blank	0.04	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10		method blank	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10		method blank	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10		method blank	0.02	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10		method blank	0.03	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10		method blank	0.03	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

No ndt is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

GORE(TM) SURVEYS ANALYTICAL RESULTS  
OASIS ENVIRONMENTAL, INC., ANCHORAGE AK  
GORE CHLORINATED HYDROCARBONS (A10)  
4TH AND GAMBELL ANCHORAGE, AK  
SITE FJI- PRODUCTION ORDER #20456055

DATE ANALYZED	FIELD ID	SAMPLE NAME	TPH, ug	CIBENZ, ug	ct12DCE, ug	112DCE, ug	c12DCE, ug	11DCA, ug	CHCl3, ug	111TCA, ug	12DCA, ug	TCE, ug	PCE, ug	14DCB, ug	CCl4, ug	112TCA, ug	1112TetCA, ug	1122TetCA, ug	13DCB, ug	12DCB, ug
		MDL=	0.02	0.02	0.04	0.04	0.03	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02
		Maximum	1885.48	0.00	0.04	0.00	0.04	0.00	0.10	0.05	0.05	1.47	402.61	0.09	0.13	0.08	0.08	0.00	0.01	0.53
		Standard Dev.	146.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.12	81.04	0.01	0.02	0.01	0.05	0.00	0.00	0.04
		Mean	22.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	26.93	0.00	0.00	0.00	0.01	0.00	0.00	0.00

No mdl is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

GORE(TM) SURVEYS ANALYTICAL RESULTS  
OASIS ENVIRONMENTAL, INC., ANCHORAGE AK  
GORE CHLORINATED HYDROCARBONS (A10)  
ESTIMATED SOIL GAS CONCENTRATION  
4TH AND GAMBELL, ANCHORAGE, AK  
SITE FJ1 - PRODUCTION ORDER #20495055

[illegible]

No mdl is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

DATE	FIELD	SAMPLE	TPH, ug/m <sup>3</sup>	CBENZ, ug/m <sup>3</sup>	et12DCE, ug/m <sup>3</sup>	12DCE, ug/m <sup>3</sup>	et12DCE, ug/m <sup>3</sup>	12DCE, ug/m <sup>3</sup>	CHCl3, ug/m <sup>3</sup>	11TCA, ug/m <sup>3</sup>	12DCA, ug/m <sup>3</sup>	TCE, ug/m <sup>3</sup>	PCE, ug/m <sup>3</sup>	14DCE, ug/m <sup>3</sup>	CO4, ug/m <sup>3</sup>	112TCA, ug/m <sup>3</sup>	112TcCA, ug/m <sup>3</sup>	13DCE, ug/m <sup>3</sup>	12DCE, ug/m <sup>3</sup>
5/27/10	B9	MDL*	0.21	0.20	3.23	3.23	3.23	3.23	0.73	1.31	0.44	0.36	0.25	0.52	0.24	0.24	0.22	0.18	0.17
5/28/10	K1	623910	3.19	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.89	nd	5.22	nd	nd	nd	nd
5/28/10	J2	623911	104.36	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.23	nd	nd	nd	nd	nd	nd
5/27/10	L7	623912	1.07	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.44	nd	1.26	nd	nd	nd	nd
5/25/10	K5	623913	159.83	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.62	nd	nd	nd	nd	nd	nd
5/26/10	B13-1	623914	11.21	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.81	nd	nd	nd	nd	nd	nd
5/27/10	B13-1	623915	23.32	nd	nd	nd	nd	nd	nd	nd	0.97	nd	0.98	nd	nd	nd	nd	nd	nd
5/27/10	B10	623916	23.32	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.98	nd	nd	nd	nd	nd	nd
5/27/10	L3	623917	272.86	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.42	nd	nd	nd	nd	nd	nd
5/25/10	K6	623918	>18666.98	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.37	nd	nd	nd	nd	nd	nd
5/27/10	K7	623919	>1604.52	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.47	nd	nd	nd	nd	nd	nd
5/24/10	B11	623921	2.96	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.28	nd	nd	nd	nd	nd	nd
5/25/10	B12	623922	9.92	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.47	nd	nd	nd	nd	nd	nd
5/26/10	D8	623923	9.92	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.47	nd	nd	nd	nd	nd	nd
5/25/10	G5-1	623924	6.95	nd	nd	nd	nd	nd	nd	nd	nd	nd	31.35	nd	nd	nd	nd	nd	nd
5/24/10	H1-1	623925	58.25	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.73	nd	nd	nd	nd	nd	nd
5/26/10	J8	623926	3.13	nd	nd	nd	nd	nd	nd	nd	nd	nd	21.98	nd	nd	nd	nd	nd	nd
5/25/10	J11	623927	234.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.59	nd	nd	nd	nd	nd	nd
5/25/10	E9	623928	2.58	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.59	nd	nd	nd	nd	nd	nd
5/27/10	E8	623929	2.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	58.45	nd	nd	nd	nd	nd	nd
5/29/10	G8	623930	2.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.73	nd	nd	nd	nd	nd	nd
5/25/10	H12	623931	62.64	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.59	nd	nd	nd	nd	nd	nd
5/25/10	J9	623932	2.02	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.18	nd	nd	nd	nd	nd	nd
5/27/10	J12	623933	10.26	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.44	nd	nd	nd	nd	nd	nd
5/27/10	E11	623934	1.89	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.34	nd	nd	nd	nd	nd	nd
5/27/10	E11	623935	3.47	nd	nd	nd	nd	nd	nd	nd	nd	nd	5.46	nd	nd	nd	nd	nd	nd
5/25/10	F8	623936	18.40	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.51	nd	nd	nd	nd	nd	nd
5/27/10	I8	623938	122.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.90	nd	nd	nd	nd	nd	nd
5/28/10	J13-1	623939	2.93	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.51	nd	nd	nd	nd	nd	nd
5/27/10	D12	623940	12.73	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.51	nd	nd	nd	nd	nd	nd
5/25/10	F1	623941	3.13	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.51	nd	nd	nd	nd	nd	nd
5/26/10	G13	623942	64.05	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.98	nd	nd	nd	nd	nd	nd
5/27/10	I8	623944	62.68	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.39	nd	nd	nd	nd	nd	nd
5/25/10	J13	623945	5.95	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.49	nd	nd	nd	nd	nd	nd
5/28/10	D13	623946	132.49	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.56	nd	nd	nd	nd	nd	nd
5/24/10	E10-1	623947	2.52	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.46	nd	nd	nd	nd	nd	nd
5/24/10	E10-1	623947	2.52	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.46	nd	nd	nd	nd	nd	nd
5/29/10	G12	623949	3.43	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.66	nd	nd	nd	nd	nd	nd
5/26/10	H8	623950	5.28	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.43	nd	nd	nd	nd	nd	nd
5/27/10	I13	623951	23.44	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.52	nd	nd	nd	nd	nd	nd
5/26/10	C13	623952	3.46	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.41	nd	nd	nd	nd	nd	nd
5/28/10	E11	623953	25.72	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.41	nd	nd	nd	nd	nd	nd
5/25/10	G11	623954	6.94	nd	nd	nd	nd	nd	nd	nd	nd	nd	8.38	nd	nd	nd	nd	nd	nd
5/26/10	G11	623955	6.94	nd	nd	nd	nd	nd	nd	nd	nd	nd	8.38	nd	nd	nd	nd	nd	nd
5/25/10	H9-1	623956	7.06	nd	nd	nd	nd	nd	nd	nd	nd	nd	8.38	nd	nd	nd	nd	nd	nd
5/25/10	I12	623957	189.27	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.07	nd	nd	nd	nd	nd	nd
5/25/10	C12-1	623958	1.67	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.88	nd	nd	nd	nd	nd	nd
5/27/10	E12	623959	3.30	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.88	nd	nd	nd	nd	nd	nd
5/27/10	E12	623959	3.30	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.88	nd	nd	nd	nd	nd	nd
5/26/10	G16	623960	1.99	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.64	nd	nd	nd	nd	nd	nd
5/26/10	H9-1	623962	7.63	nd	nd	nd	nd	nd	nd	nd	nd	nd	7.65	nd	nd	nd	nd	nd	nd
5/29/10	I11	623963	7.90	nd	nd	nd	nd	nd	nd	nd	nd	nd	7.46	nd	nd	nd	nd	nd	nd
5/24/10	C12-1	623968	4.05	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.56	nd	nd	nd	nd	nd	nd
5/26/10	E13	623969	118.86	nd	nd	nd	nd	nd	nd	2.40	nd	nd	1.63	nd	nd	nd	nd	nd	nd
5/25/10	C13	623970	34.38	nd	nd	nd	nd	nd	nd	nd	nd	nd	8.69	nd	nd	nd	nd	nd	nd
5/25/10	G13	623971	6.94	nd	nd	nd	nd	nd	nd	nd	nd	nd	8.69	nd	nd	nd	nd	nd	nd
5/26/10	H10	623972	24.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd	nd	nd	nd	nd
5/24/10	I10	623973	3.48	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.29	nd	nd	nd	nd	nd	nd
5/27/10	L13	623974	13.99	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.03	nd	nd	nd	nd	nd	nd
5/27/10	L13-1	623975	2.52	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.74	nd	nd	nd	nd	nd	nd
5/26/10	D4	623976	5.74	nd	nd	nd	nd	nd	nd	nd	nd	nd	>2182.73	nd	nd	0.54	nd	nd	nd
5/26/10	M4	623978	34.94	nd	nd	nd	nd	nd	nd	nd	nd	nd	5.34	nd	nd	nd	nd	nd	nd
5/26/10	K13	623980	12.36	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.37	nd	nd	nd	nd	nd	nd
5/27/10	L12	623981	>2186.46	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.64	nd	nd	nd	nd	nd	nd
5/26/10	C4	623982	3.31	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.76	>4845.41	nd	1.40	nd	nd	nd
5/27/10	F4	623983	11.73	nd	nd	nd	nd	nd	nd	nd	nd	nd	5.23	nd	nd	nd	nd	nd	nd
5/26/10	L11	623984	18.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	15.46	nd	nd	nd	nd	nd	nd
5/29/10	K12	623986	26.66	nd	nd	nd	nd	nd	nd	nd	nd	nd	15.46	nd	nd	nd	nd	nd	nd
5/26/10	L11	623987	18.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.31	nd	nd	nd	nd	nd	nd
5/26/10	B4	623988	3.73	nd	nd	nd	nd	nd	nd	nd	nd	nd	>2337.23	nd	nd	nd	nd	nd	nd
5/26/10	G4	623989	22.39	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.87	nd	nd	nd	nd	nd	nd
5/26/10	K11	623992	268.03	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.49	nd	nd	nd	nd	nd	nd
5/26/10	L10	623993	2.96	nd	nd	nd	nd	nd	nd	nd	nd	nd	>2669.54	nd	nd	nd	nd	nd	nd
5/25/10	A4	623994	2.96	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.98	>2669.54	nd	nd	nd	nd	nd
5/27/10	A4-1	623995	21.50	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.51	nd	nd	nd	nd	nd	nd

No mdl is available for summed combinations of analytes. In summed columns (eg. BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

GORE(TM) SURVEYS ANALYTICAL RESULTS  
OASIS ENVIRONMENTAL, INC., ANCHORAGE AK  
GORE CHLORINATED HYDROCARBONS (A10)  
ESTIMATED SOIL GAS CONCENTRATION  
4TH AND GAMBELL, ANCHORAGE, AK  
SITE FJ1 - PRODUCTION ORDER #20495065

DATE ANALYZED	SAMPLE ID	SAMPLE NAME	TPH, ug/m <sup>3</sup>	CBENZ, ug/m <sup>3</sup>	a12DCE, ug/m <sup>3</sup>	112DCE, ug/m <sup>3</sup>	c7+DCE, ug/m <sup>3</sup>	10DCA, ug/m <sup>3</sup>	CHCl3, ug/m <sup>3</sup>	11TCA, ug/m <sup>3</sup>	12DCA, ug/m <sup>3</sup>	TCE, ug/m <sup>3</sup>	PCE, ug/m <sup>3</sup>	14DCB, ug/m <sup>3</sup>	CO4, ug/m <sup>3</sup>	112TCA, ug/m <sup>3</sup>	112TeCA, ug/m <sup>3</sup>	13DCB, ug/m <sup>3</sup>	12DOB, ug/m <sup>3</sup>
		MDL=	1.34	0.20			3.23	1.16	1.09	0.73	1.31	0.44	0.36	0.25	0.17	0.24	0.32	0.18	0.17
5/25/10	K10	623988	0.21	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	L9	623989	1.71	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	M3	624001	1.71	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	H4	624002	2.50	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	5.79	nd	nd	nd	nd	nd
5/27/10	K9	624004	3.30	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.83	nd	nd	nd	nd	nd
5/26/10	L8	624005	9.69	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.43	nd	nd	nd	nd	nd
5/26/10	M12	624006	41.19	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.79	nd	nd	nd	nd	nd
5/25/10	I4	624007	11.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	K8	624010	4.65	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.49	nd	344.87	nd	nd	nd
5/26/10	M11	624011	1.71	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	M11	624012	0.79	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	J4	624013	4.07	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	28.71	nd	nd	nd	nd	nd
5/27/10	J10	624016	12.04	nd	nd	nd	nd	nd	nd	nd	nd	1.10	nd	0.46	nd	nd	nd	nd	nd
5/24/10	M9	624017	13.18	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	M10	>1127.62	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.34	nd	nd	nd	nd	nd
5/25/10	K4	624019	22.06	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.48	nd	nd	nd	nd	nd
5/25/10	bbl	623980	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	bbl	623982	0.24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	L26	624002	0.26	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	624008		0.36	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/24/10	method blank		0.43	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/25/10	method blank		0.43	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	bbl		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	bbl		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/26/10	method blank		0.24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/27/10	method blank		0.31	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5/28/10	method blank		0.26	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
		Maximum	18966.89	0.00	1.48	0.00	0.00	1.48	0.00	3.44	2.40	1.10	25.18	4945.41	0.78	5.22	6.79	0.00	4.46
		Standard Dev.	1463.01	0.00	0.11	0.00	0.00	0.30	0.30	0.86	0.22	0.15	2.07	981.33	0.08	0.86	0.53	0.00	0.34
		Mean	224.71	0.00	0.01	0.00	0.00	0.01	0.00	0.03	0.03	0.02	0.95	526.40	0.01	0.15	0.06	0.00	0.03

No mdl is available for summed combinations of analytes. In summed columns (e.g., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

## GORE™ Surveys

### KEY TO DATA TABLE 4<sup>th</sup> and Gambell, Anchorage, AK

#### UNITS

µg	micrograms, relative mass value
µg/m <sup>3</sup>	micrograms per cubic meter, estimated soil gas concentration
MDL	method detection limit
bdl	below detection limit
nd	non-detect
>	indicates concentration value biased low due to high mass level on sorbent

#### ANALYTES

TPH	total petroleum hydrocarbons
ct12DCE	cis- & trans-1,2-dichloroethene
t12DCE	trans-1,2-dichloroethene
c12DCE	cis-1,2-dichloroethene
VC	vinyl chloride
11DCA	1,1-dichloroethane
CHC13	chloroform
111TCA	1,1,1-trichloroethane
12DCA	1,2-dichloroethane
CC14	carbon tetrachloride
TCE	trichloroethene
PCE	tetrachloroethene
CIBENZ	chlorobenzene
14DCB	1,4-dichlorobenzene
11DCE	1,1-dichloroethene
112TCA	1,1,2-trichloroethane
1112TetCA	1,1,1,2-tetrachloroethane
1122TetCA	1,1,2,2-tetrachloroethane
13DCB	1,3-dichlorobenzene
12DCB	1,2-dichlorobenzene

#### BLANKS

method blank	QA/QC module, documents analytical conditions during analysis
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## **APPENDIX E**

### **ADEC Data Review Checklists**



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## Laboratory Data Review Checklist for Air Samples

Completed By:	B Martich
Title:	Environmental Scientist
Date:	March 22, 2010
CS Report Name:	4th and Gambell Additional Site Characterization
Report Date:	March 2010
Consultant Firm:	OASIS Environmental
Laboratory Name:	Air Toxics
Laboratory Report Number:	1003039A
ADEC File Number:	2100.38.434
ADEC Hazard ID:	4084

1. Laboratory

- a. Did a NELAP certified laboratory receive and
- perform
- all of the submitted sample analyses?

☒ Yes☐ No

Comments:

--

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

☐ Yes☐ No

Comments:

NA
----

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?

☒ Yes☐ No

Comments:

--

- b. Correct analyses requested?

☒ Yes☐ No

Comments:

--

## Laboratory Data Review Checklist for Air Samples

3. Laboratory Sample Receipt Documentation

- a. Sample condition documented- Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

☒ Yes☐ No

Comments:

- b. If there were any discrepancies, were they documented? For example, incorrect sample containers, sample holding times outside of acceptable range, insufficient of missing samples, canister not holding a vacuum, etc.?

☐ Yes☐ No

Comments:

- c. Data quality or usability affected? Please explain.

☐ Yes☐ No

Comments:

4. Case Narrative

- a. Present and understandable?

☒ Yes☐ No

Comments:

- b. Discrepancies, errors or QC failures identified by the lab?

☒ Yes☐ No

Comments:

- c. Were all corrective actions documented?

☒ Yes☐ No

Comments:

- d. What is the effect on data quality/usability according to the case narrative?

☐ Yes☐ No

Comments:

5. Sample Results

- a. Correct analyses performed/reported as requested on COC?

☒ Yes☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

b. Samples analyzed within 30 days of collection or within the time required by the method?

☒ Yes

☐ No

Comments:

c. Is the data reported in micrograms per meter cube volume ( $\mu\text{g}/\text{m}^3$ )?

☒ Yes

☐ No

Comments:

d. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

☐ Yes

☒ No

Comments:

See 4d above

e. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

See 4d above

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

☒ Yes

☐ No

Comments:

ii. All method blank results less than PQL?

☒ Yes

☐ No

Comments:

iii. If above PQL, what samples are affected?

☐ Yes

☐ No

Comments:

NA

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

NA

v. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

## Laboratory Data Review Checklist for Air Samples

## b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics - One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

☒ Yes ☐ No

Comments:

- iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

☐ Yes ☐ No

Comments:

- iv. If % R or RPD is outside of acceptable limits, what samples are affected?

☐ Yes ☐ No

Comments:

- v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No

Comments:

- vi. Data quality or usability affected? Please explain.

☐ Yes ☐ No

Comments:

## c. Surrogates - Organics Only

- i. Are surrogate recoveries reported for organic analyses - QC and laboratory samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits?

☒ Yes ☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

NA

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 soil gas or indoor air samples?

☒ Yes

☐ No

Comments:

ii. Submitted blind to lab?

☒ Yes

☐ No

Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 25%)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration  
 $R_2$  = Field Duplicate Concentration

☒ Yes

☐ No

Comments:

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

☐ Yes

☐ No

Comments:

NA

## Laboratory Data Review Checklist for Air Samples

Completed By:	B Martich
Title:	Environmental Scientist
Date:	March 22, 2010
CS Report Name:	4th and Gambell Additional Site Characterization
Report Date:	March 2010
Consultant Firm:	OASIS Environmental
Laboratory Name:	Air Toxics
Laboratory Report Number:	1003039B
ADEC File Number:	2100.38.434
ADEC Hazard ID:	4084

1. Laboratory

- a. Did a NELAP certified laboratory receive and
- perform
- all of the submitted sample analyses?

☒ Yes☐ No

Comments:

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- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

☐ Yes☐ No

Comments:

NA
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2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?

☒ Yes☐ No

Comments:

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- b. Correct analyses requested?

☒ Yes☐ No

Comments:

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## Laboratory Data Review Checklist for Air Samples

3. Laboratory Sample Receipt Documentation

- a. Sample condition documented- Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

☒ Yes☐ No

Comments:

- b. If there were any discrepancies, were they documented? For example, incorrect sample containers, sample holding times outside of acceptable range, insufficient of missing samples, canister not holding a vacuum, etc.?

☐ Yes☐ No

Comments:

- c. Data quality or usability affected? Please explain.

☐ Yes☐ No

Comments:

4. Case Narrative

- a. Present and understandable?

☒ Yes☐ No

Comments:

- b. Discrepancies, errors or QC failures identified by the lab?

☐ Yes☐ No

Comments:

- c. Were all corrective actions documented?

☐ Yes☐ No

Comments:

- d. What is the effect on data quality/usability according to the case narrative?

☐ Yes☐ No

Comments:

5. Sample Results

- a. Correct analyses performed/reported as requested on COC?

☒ Yes☐ No

Comments:



## Laboratory Data Review Checklist for Air Samples

b. Samples analyzed within 30 days of collection or within the time required by the method?

☒ Yes

☐ No

Comments:

c. Is the data reported in micrograms per meter cube volume ( $\mu\text{g}/\text{m}^3$ )?

☒ Yes

☐ No

Comments:

d. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

☐ Yes

☐ No

Comments:

e. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

☒ Yes

☐ No

Comments:

ii. All method blank results less than PQL?

☒ Yes

☐ No

Comments:

iii. If above PQL, what samples are affected?

☐ Yes

☐ No

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

v. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

## b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics - One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

☒ Yes ☐ No

Comments:

- iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

☐ Yes ☐ No

Comments:

- iv. If % R or RPD is outside of acceptable limits, what samples are affected?

☐ Yes ☐ No

Comments:

- v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No

Comments:

- vi. Data quality or usability affected? Please explain.

☐ Yes ☐ No

Comments:

## c. Surrogates - Organics Only

- i. Are surrogate recoveries reported for organic analyses - QC and laboratory samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits?

☒ Yes ☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

NA

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 soil gas or indoor air samples?

☒ Yes

☐ No

Comments:

ii. Submitted blind to lab?

☒ Yes

☐ No

Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 25%)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration  
 $R_2$  = Field Duplicate Concentration

☒ Yes

☐ No

Comments:

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

☐ Yes

☐ No

Comments:

NA

## Laboratory Data Review Checklist for Air Samples

Completed By:	B Martich
Title:	Envt Scientist
Date:	June 24, 2010
CS Report Name:	4th and Gambell Additional Characterization
Report Date:	June 2010
Consultant Firm:	OASIS Environmental
Laboratory Name:	Air Toxics
Laboratory Report Number:	1005429A
ADEC File Number:	2100.38.434
ADEC Hazard ID:	4084

1. Laboratory

- a. Did a NELAP certified laboratory receive and
- perform
- all of the submitted sample analyses?

☒ Yes☐ No

Comments:

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- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

☐ Yes☐ No

Comments:

NA
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2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?

☒ Yes☐ No

Comments:

--

- b. Correct analyses requested?

☒ Yes☐ No

Comments:

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## Laboratory Data Review Checklist for Air Samples

3. Laboratory Sample Receipt Documentation

- a. Sample condition documented- Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

☒ Yes☐ No

Comments:

- b. If there were any discrepancies, were they documented? For example, incorrect sample containers, sample holding times outside of acceptable range, insufficient of missing samples, canister not holding a vacuum, etc.?

☒ Yes☐ No

Comments:

Sample from IA-2 (116IA) had high remaining vacuum

- c. Data quality or usability affected? Please explain.

☐ Yes☐ No

Comments:

No - PCE still detected. TCE detection limit above target level but PCE is primary risk factor

4. Case Narrative

- a. Present and understandable?

☒ Yes☐ No

Comments:

- b. Discrepancies, errors or QC failures identified by the lab?

☒ Yes☐ No

Comments:

dilution required for CS-1 (119CS) and CS-2 (120CS) because of elevated non-target analytes in samples

- c. Were all corrective actions documented?

☒ Yes☐ No

Comments:

None necessary

- d. What is the effect on data quality/usability according to the case narrative?

☐ Yes☐ No

Comments:

TCE detection limits above target level, but PCE is primary risk factor and it was detected in both samples

5. Sample Results

- a. Correct analyses performed/reported as requested on COC?

☒ Yes☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

b. Samples analyzed within 30 days of collection or within the time required by the method?

☒ Yes

☐ No

Comments:

c. Is the data reported in micrograms per meter cube volume ( $\mu\text{g}/\text{m}^3$ )?

☒ Yes

☐ No

Comments:

d. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

☐ Yes

☒ No

Comments:

Elevated TCE PQLs for reasons described above

e. Data quality or usability affected? Please explain.

☐ Yes

☒ No

Comments:

PCE detected in all affected samples, and it is the primary risk factor

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

☒ Yes

☐ No

Comments:

ii. All method blank results less than PQL?

☒ Yes

☐ No

Comments:

iii. If above PQL, what samples are affected?

☐ Yes

☐ No

Comments:

NA

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

NA

v. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

## Laboratory Data Review Checklist for Air Samples

## b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics - One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

☒ Yes ☐ No

Comments:

- iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

☒ Yes ☐ No

Comments:

- iv. If % R or RPD is outside of acceptable limits, what samples are affected?

☐ Yes ☐ No

Comments:

- v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No

Comments:

- vi. Data quality or usability affected? Please explain.

☐ Yes ☐ No

Comments:

## c. Surrogates - Organics Only

- i. Are surrogate recoveries reported for organic analyses - QC and laboratory samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits?

☒ Yes ☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

NA

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 soil gas or indoor air samples?

☒ Yes

☐ No

Comments:

ii. Submitted blind to lab?

☒ Yes

☐ No

Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 25%)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration  
 $R_2$  = Field Duplicate Concentration

☒ Yes

☐ No

Comments:

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

☐ Yes

☐ No

Comments:

NA



## Laboratory Data Review Checklist for Air Samples

Completed By:	B Martich
Title:	Envt Scientist
Date:	June 24, 2010
CS Report Name:	4th and Gambell Additional Characterization
Report Date:	June 2010
Consultant Firm:	OASIS Environmental
Laboratory Name:	Air Toxics
Laboratory Report Number:	1005429B
ADEC File Number:	2100.38.434
ADEC Hazard ID:	4084

1. Laboratory

- a. Did a NELAP certified laboratory receive and
- perform
- all of the submitted sample analyses?

☒ Yes☐ No

Comments:

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- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

☐ Yes☐ No

Comments:

NA
----

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?

☒ Yes☐ No

Comments:

--

- b. Correct analyses requested?

☒ Yes☐ No

Comments:

--

## Laboratory Data Review Checklist for Air Samples

3. Laboratory Sample Receipt Documentation

- a. Sample condition documented- Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

☒ Yes☐ No

Comments:

- b. If there were any discrepancies, were they documented? For example, incorrect sample containers, sample holding times outside of acceptable range, insufficient of missing samples, canister not holding a vacuum, etc.?

☒ Yes☐ No

Comments:

Sample 121SG reported vacuum and lab measurement greater than 5inHg; leak test confirmed tightness of valve

- c. Data quality or usability affected? Please explain.

☐ Yes☒ No

Comments:

4. Case Narrative

- a. Present and understandable?

☒ Yes☐ No

Comments:

- b. Discrepancies, errors or QC failures identified by the lab?

☐ Yes☐ No

Comments:

NA

- c. Were all corrective actions documented?

☐ Yes☐ No

Comments:

NA

- d. What is the effect on data quality/usability according to the case narrative?

☐ Yes☐ No

Comments:

NA

5. Sample Results

- a. Correct analyses performed/reported as requested on COC?

☒ Yes☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

b. Samples analyzed within 30 days of collection or within the time required by the method?

☒ Yes

☐ No

Comments:

c. Is the data reported in micrograms per meter cube volume ( $\mu\text{g}/\text{m}^3$ )?

☒ Yes

☐ No

Comments:

d. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

☒ Yes

☐ No

Comments:

e. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

☒ Yes

☐ No

Comments:

ii. All method blank results less than PQL?

☒ Yes

☐ No

Comments:

iii. If above PQL, what samples are affected?

☐ Yes

☐ No

Comments:

NA

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

NA

v. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

## Laboratory Data Review Checklist for Air Samples

## b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics - One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

☒ Yes ☐ No

Comments:

- iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

☒ Yes ☐ No

Comments:

- iv. If % R or RPD is outside of acceptable limits, what samples are affected?

☐ Yes ☐ No

Comments:

- v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No

Comments:

- vi. Data quality or usability affected? Please explain.

☐ Yes ☐ No

Comments:

## c. Surrogates - Organics Only

- i. Are surrogate recoveries reported for organic analyses - QC and laboratory samples?

☒ Yes ☐ No

Comments:

- ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits?

☒ Yes ☐ No

Comments:

## Laboratory Data Review Checklist for Air Samples

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☐ Yes

☐ No

Comments:

NA

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 soil gas or indoor air samples?

☒ Yes

☐ No

Comments:

ii. Submitted blind to lab?

☒ Yes

☐ No

Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 25%)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration  
 $R_2$  = Field Duplicate Concentration

☒ Yes

☐ No

Comments:

iv. Data quality or usability affected? Please explain.

☐ Yes

☐ No

Comments:

NA

### 7. Other Data Flags/Qualifiers

a. Defined and appropriate?

☐ Yes

☐ No

Comments:

NA